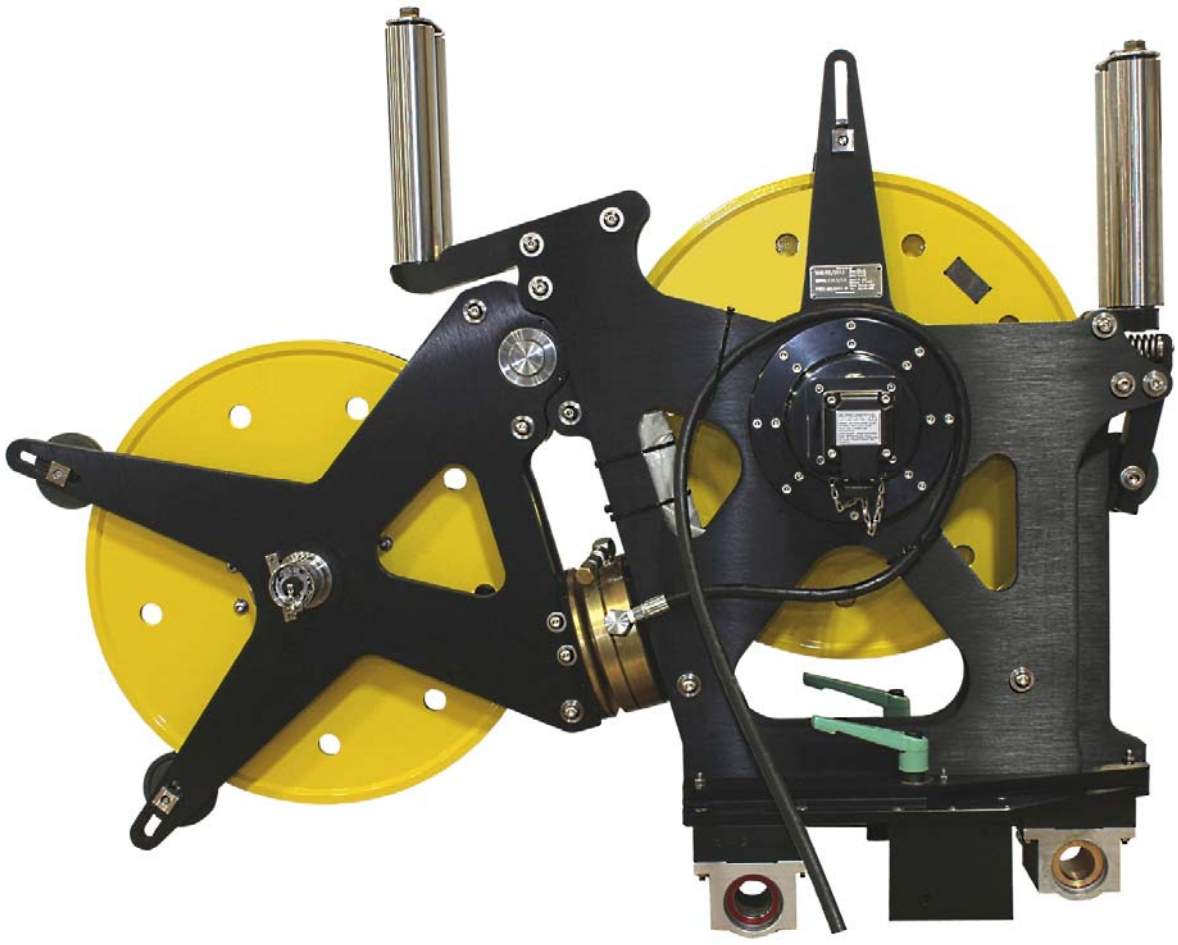
BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton,Texas 77476
Phone: 281.346.4300
Fax: 281.346.4301
benchmarkwireline.com

AMSLA595 - THRESHER

COMBINED DEPTH/TENSION
HEAVY DUTY SLICKLINE MEASUREMENT DEVICE



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SAFETY WARNINGS

This apparatus is suitable for use in ATEX Zone 2 Locations.

This apparatus is suitable for use in Class I, Division 2, Groups A, B, C, & D Hazardous (Classified) or Unclassified Locations.

WARNING – EXPLOSION HAZARD – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR ATEX Zone 2 LOCATIONS.

AVERTISSEMENT – RISQUE D'EXPLOSION – LA SUBSTITUTION DE COMPOSANT PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES ATEX Zone 2 LOCALES.

WARNING - EXPLOSION HAZARD – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2;

AVERTISSEMENT - RISQUE D'EXPLOSION – LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE I, DIVISION 2

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOW TO BE NON-HAZAROUS;

AVERTISSEMENT – RISQUE D'EXPLOSION – AVANT DE DECONNECTER L'EQUIPMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DESIGNE NON DANGEREUX.

WARNING - PROTECTION MAY BE IMPAIRED IF THIS DEVICE IS USED IN AN APPLICATION OR MANNER NOT SPECIFIED IN THE MANUAL

NOTE – The safe ambient temperature operating range for this equipment is -20 to 40C or -4 to 104F.

BenchMark measuring equipment will frequently be operated in hazardous environments. Appropriate safety precautions need to be taken.

Training - Operators shall be trained in the proper and safe use of the device.

Do not exceed the tension limit specified for this device in this manual.

SAFETY WARNINGS continued

Flammable Substances - Flammable and explosive substances are often found in the proximity of the equipment operations. Proper venting should take place where practicable. Avoid open flames, sparks and other ignition sources.

Electric Shock – Depending on the equipment being used, both AC and DC current may be present. Frequently in wellsite operations conductive fluids and chemicals are used. Use extra caution when working with BenchMark equipment and follow manufacturer warnings to avoid electric shock.

Do not separate any electrical connector, while powered, in a hazardous area. Separate only when power is removed, and/or in a safe area.

Safe Operating Temperatures – BenchMark Wireline equipment is designed to operate safely within these temperature ranges. Do not try to operate this equipment in conditions that outside these temperature limits.

The safe ambient temperature operating range for this equipment is -20 to 40C or -4 to 104F.

Hazardous Equipment Marking - See General Assembly drawings for hazardous equipment marking.

ALL WARNING LABELS ON THE EQUIPMENT MUST BE OBSERVED AND FOLLOWED.

Installation Instructions - Install measuring device onto the spooling mechanism per the unit manufacturer instructions. Take care to avoid pinching or cutting of electrical cables when the measuring device moves during the spooling operation.

Take care to thread the wire through the device properly to prevent the wire from rubbing the frame during operation. The Table of Contents of this manual will list where the threading procedure is located.

Rotating Equipment – BenchMark Wireline measuring equipment is often attached to rotating industrial machinery. This may include winches, pulleys, rigging, rotating drums plus moving cable and wire. Though BenchMark's measuring equipment does not normally present a safety hazard when in operation provided it is used within the design parameters of the equipment, the heavy equipment used in this type of work in proximity to BenchMark's equipment may. Never attempt to use BenchMark equipment in any way or for any other purpose than for which it was designed.

Use every precaution to keep a safe distance from dangerous equipment when it is in operation. Never approach the measuring device while the cable drum is turning.

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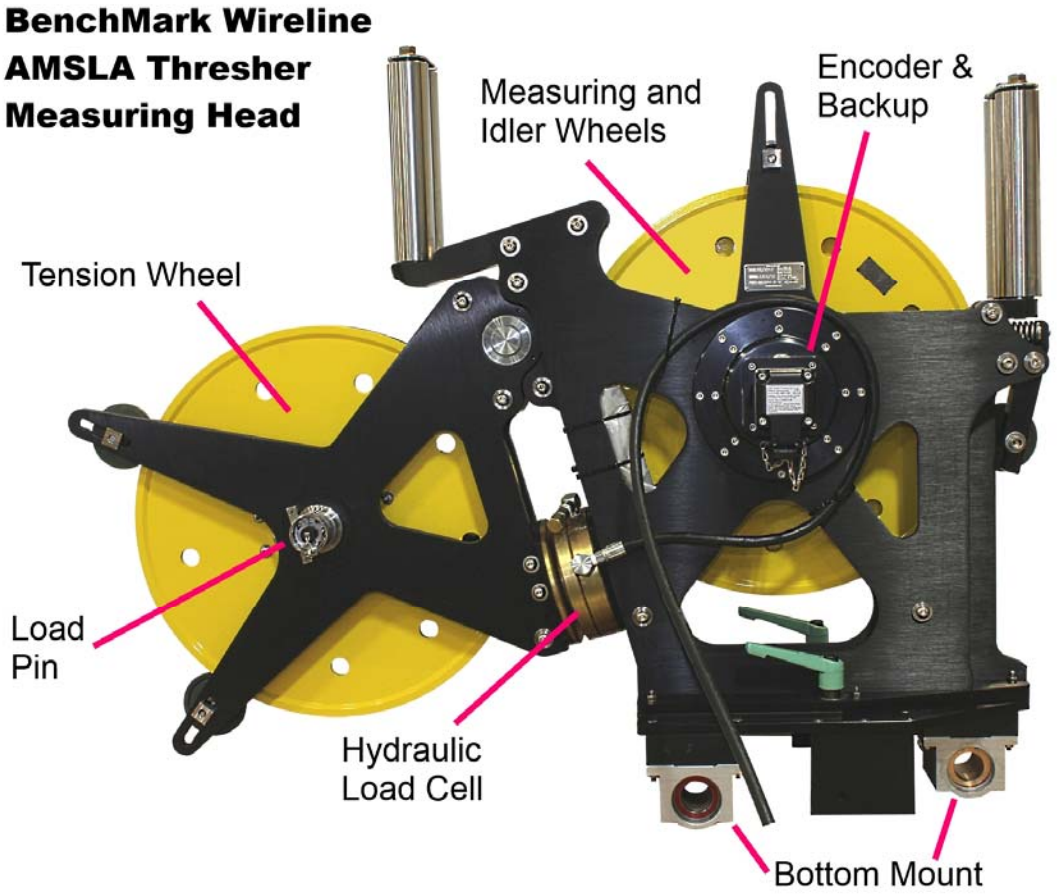
1.0 QUICK START GUIDE

Determine wireline size to be used – .092" to 5/16”

Since the wireline wraps around the depth wheel, the circumference of the depth wheel will change with a change in wire size. The wheel size setting needs to be set to match the wireline size in order to accurately measure depth.

These corrections are automatically made in the BenchMark hoistman's panel by selecting the proper cable size using the menu. If a different panel is used, the wheel size will need to be entered at this time.



Equipment Setup Procedure

This equipment is to be installed only by personnel who are suitably trained and qualified to local/national codes.

1. Install the measuring head on the wireline equipment.
    Bolt the mounting bracket to the wireline equipment
    Connect the measuring head to the mounting bracket

2. Connect the cables for to the encoder, backup and load pin to the measuring head.

3. Power up the panel connected to the measuring head and verify it is working properly.

Verify the panel is configured to match the system
- Line size
- Measurement units
- Encoder settings

4. Install the line in measuring head and set the line size parameter on the panel.
    Note – see Proper Wire Threading Path on next page.

5. Set Tension Alarm value.

6. Set depth adjust value if necessary.

7. Ensure data file is being recorded. Applies only to 60 Series panels.

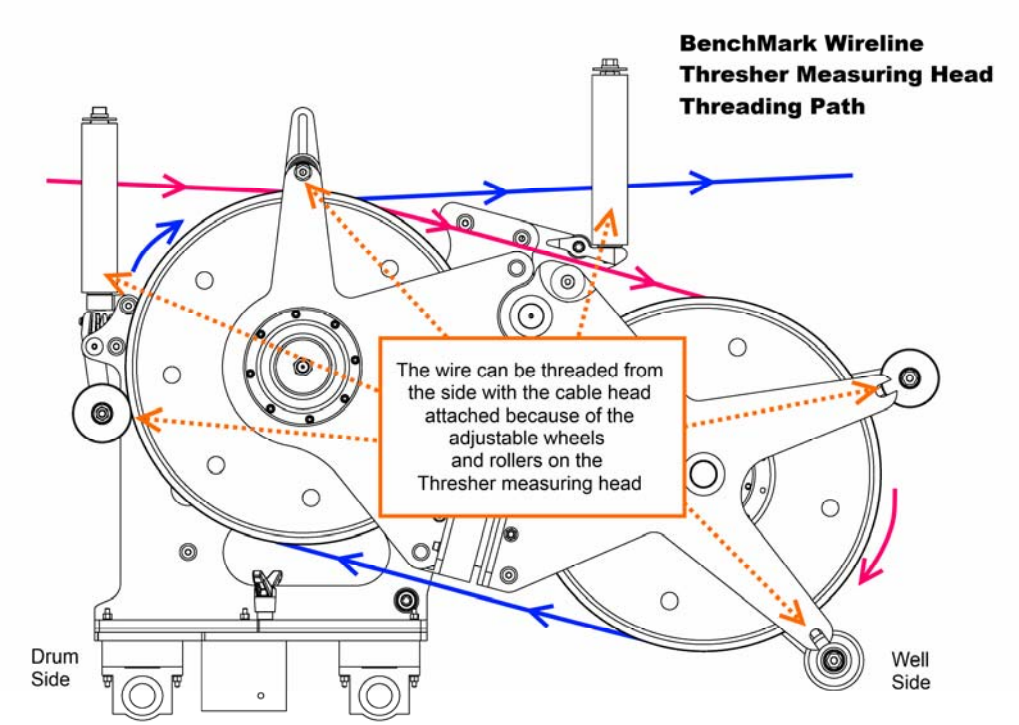
9. Rig up through sheaves, install tool, and slack off weight.

10. Set depth to zero.

11. Press T-Zero to set tension to zero. Press T-CAL and verify that panel tension reads 4000 or 5000 lbs (depending on type of measuring head selected)

12. Pull tool to depth 0 position. Press D-Zero to reset the panel depth to 0.

Proper Wire Threading Path


BenchMark Wireline
Thresher Measuring Head
Threading Path
The wire can be threaded from the side with the cable head attached because of the adjustable wheels and rollers on the Thresher measuring head
Drum Side
Well Side

Obtaining Technical Assistance

Call BenchMark Wireline Products Inc. at +1 281 346 4300
Or contact by email mail@benchmarkwireline.com
Or fax in request at +1 281 346 4301

Information is also available on website www.benchmarkwireline.com

Parts can be ordered by email, phone, or fax.

Equipment can be returned for repair and maintenance.
Please notify us by Phone, email, or fax before sending any equipment.

To return equipment to BenchMark, ship it to:
BenchMark Wireline Products
36220 FM 1093
Simonton, Texas 77476
U.S.A.

Note – For better response, please have the Part Number available.

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Recommended Spare Parts List - AMSLA THRESHER

This is a list of recommend spare parts. Normally you would stock the suggested QTY of spares. For REMOTE areas where resupply is difficult, use the REMOTE amounts.

ITEM	P/N	DESCRIPTION	QTY	REMOTE
1		WHEEL MEASURING 4FT 0.092-1/4	0	1
2	AMSLA560	WHEEL ASSY TENS 20" 5/16 MAKO	0	1
4	AM3KM040	ADAPTER ENCODER H25D/H20 MAG	0	1
12	AMSLA162	WHEEL ASSY PRESS RLR 1/4 TENSN	2	2
13	AMSLA163	WHEEL ASSY PRESS RLR 1/4 MEASR	1	2
NOTE - ONLY STOCK THE LOAD AXLE USED IN YOUR MEASURING HEAD				
20	AMSLA215A	ASSY LOAD AXLE 4-20mA 1.50 DIA 15K# LINE PULL 2WIR Exn	0	1
20	AMSLA252A	ASSY LOAD AXLE 2MV/V 1-1/2 Z2 P10-6P DUAL PASSIV 09ATEX41118	0	1
20	AMSLA253A	ASSY LOAD AXLE 2MV/V 1-1/2 Z2 P10-6P PASSIVE 09ATEX41118	0	1
20	AMSLA272A	ASSY LOAD AXLE 2MV/V 1-1/2 Z2 KP16-8P PASSIVE 09ATEX41118	0	1
20	AMSLA277A	ASSY LOAD AXLE 2MV/V 1-1/2 Z2 MS14S 6P PASSIVE 09ATEX41118	0	1
20	AMSLA278A	ASSY LOAD AXLE 2MV/V 1-1/2 Z2 CWL18 10P PASSIVE 09ATEX41118	0	1
20	AMSLA287A	ASSY LOAD AXLE 2MV/V 1-1/2 Z2 CWL18 10P PASSIVE 09ATEX41118	0	1
20	AMSLA550B	ASSY LOAD AXLE 0-1.5V 1-1/2DIA 0-15000# KPT16 8 PIN Exn	0	1
21	AM3KM050	COUPLING ENCDR W/BKUP MAGNETS	0	2
NOTE - ONLY STOCK THE ENCODER USED IN YOUR MEASURING HEAD				
49	AM5KA055	ASSY ENCODER BACKUP MAGNETIC	0	1
49	AM5KA058	ASSY ENCDR BACKUP MAG EEx nA	0	1
50	AM5KA068B	ASSY ENCDR 1200 PPR OPTICAL MS16 HES Ex nA ETL09ATEX41123	0	1
50	AM5KA070B	ASSY ENCDR 512/780 PPR OPTICAL KP14 Ex nA ETL09ATEX41123	0	1
50	AM5KA074B	ASSY ENCDR 1200 PPR OPTICAL MS18 Ex nA ETL09ATEX41123	0	1
50	AM5KA079B	ASSY ENCDR 1200 PPR OPTICAL MS16 STD Ex nA ETL09ATEX41123	0	1
50	AM5KA080B	ASSY ENCDR 1200 PPR OPTICAL MS16 BLUE Ex nA ETL09ATEX41123	0	1
51	AMS1P090	COUPLING OLDHAM ENCODER	1	2
52	AMSLP040	BEARING SPHERE-ROL 50MM ID	1	2
53	AMSLP030	BEARING BALL 30MM 2-ROW SST	1	2
54	AM3KP204	BEARING BALL 20MM SST ABEC-1	2	2

2.0 GENERAL DESCRIPTION & FEATURES

2.1 PRODUCT DESCRIPTION & INTENDED USE OF EQUIPMENT

The "Orca" Slickline Measuring Device is a heavy duty three wheeled device which accurately measures both wireline depth, line speed and tension. It minimizes wire abrasion and fatigue by using a non reverse bend configuration.

The device is designed to be mounted in front of the wireline drum on a spooling mechanism. Linear bearings in the mount allow it to slide back and forth in front of the drum so the wire can be spooled evenly. The bracket on the top of the measuring head is used to mount it to the wireline unit. Spooling rollers and pressure wheels are provided to keep the wire in the wheels at low or no tension.

This measuring head is different from previous versions in that the wireline can be removed from the measuring head without cutting off the re-head. The wireline can be removed from the side. The guide rollers are slotted so they can be slid out of the way to remove the wireline.

Tension is measured from a load pin which also serves as the axle for the tension wheel. The Orca also has a hydraulic load cell which is an independent tension measuring device. Since the tension wheel is opposite the measuring and idler wheel, the wire completely wraps around both wheel sets. This creates a relatively high signal at the load pin which provides a very accurate tension measurement.

With the BenchMark Winchman's Panel, depth can be accurately measured on different sized lines without changing wheels. This is done electronically by the panel using the depth information provided by an encoder. Changes in wire size are accounted for by the panel software. Wire stretch can also be automatically calculated by the panel. An adapter is provided to drive a standard mechanical counter.

2.2 SAFETY STANDARDS & UL CLASS 1, DIVISION 2 REQUIREMENTS

We have been evaluated and comply with these standards:

UL Standard for Electrical Equipment for Measurement, Control, and Laboratory Use; Part 1: General Requirements (UL 61010-1, 2nd Ed., October 28, 2008)

Standard for Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use; Part 1: General Requirements (CAN/CSA C22.2 No. 61010-1-04 (R2009))

Standard for Nonincendive Electrical Equipment For Use in Class 1 and 2, Division 2 and Class 3, Divisions 1 and 2 Hazardous (Classified) Locations (ANSI/ISA 12.12.01-2011)

Standard for Non-Incendive Electrical Equipment For Use in Class 1, Division 2 Hazardous Locations (CSA C22.2 No. 213-M1987 (R2008))

2.3 TYPE EXAMINATION CERTIFICATES

Certificates will go in this section.

2.4 TECHNICAL SPECIFICATIONS

2.4.1 WIRE PATH

The wire runs from the well around the measure wheel (wheel nearest drum) then around the tension wheel and back across the top of the idler wheel onto the drum. The tension wheel is tilted slightly with respect to the measuring wheel so that the wire enters the wheel on one side of the groove and exits the wheel on the opposite side of the groove. Guide rollers are aligned to assist in keeping the wire on the proper side of the groove.

The wire runs through a non reversed bend configuration (i.e. the wire is always bent in the same direction). This minimizes wire fatigue which normally occurs by bending the wire in opposite directions each time it passes through the measuring head. The large wheel radius minimizes the effects of fatigue and promotes longer wire life, especially with larger diameter wirelines.

Guide rollers are installed on the tension wheel to keep the wire in the groove. A spring mounted pressure roller is used on the measure wheel to ensure the wire is always pressed tightly against the measure wheel to prevent wire slippage at low tension which minimizes measurement error. The spring tightly presses the wire against the wheel regardless of wire size. The spring force keeps the wire turning the wheel even with sudden changes of direction during jarring action. A composite keeper roller is mounted above the measure wheel to keep the wire in the groove when wireline tension is relaxed such as during transport and rigup.

2.4.2 DEPTH MEASUREMENT

Depth measurement is made by wrapping the wire around the measuring wheel which has a precision machined groove. The wheel groove has a diameter of 20.06 inches. The wheel is hardened to greater than Rockwell 58 by using a special heat treat process. This minimizes wheel wear to maximize wheel life.

This measuring head is capable of providing three completely independent depth measurements, a mechanical counter, an optical encoder, and a magnetic pickup.

The optical encoder provides a high resolution measurement to the BenchMark Wireline Products hoistman's panel. With this panel depth and line speed can be accurately measured on different sized lines without changing wheels. This is done electronically by the panel. Changes in wire size are accounted for by the panel software. Wire stretch can also be automatically calculated by the panel. The panel operates on 12-24 vdc and supplies the necessary power to the encoder and load pin.

A backup depth system is available to provide another independent depth measurement. Depth is measured by a frictionless magnetic pickup mounted in the measuring head. The pickup consists of magnets imbedded in the measure wheel coupling and two hall affect devices mounted next to the shaft. This provides a quadarature type measurement. A small display panel is mounted inside a wireline unit. The panel is designed to be connected to an external AC or DC supply or operate off internal batteries for up to 15 hours between charges. In the event of an external power interruption, the unit automatically switches to battery power. The system is designed to operate without intervention from the user. When external power fails, the depth display is maintained by the batteries. A switch on the front of the panel allows different sizes of wire to be measured accurately without changing the measuring wheels.

2.4.3 TENSION SPECIFICATIONS

The wheel nearest the well rotates on an axle pin that is instrumented with strain gauges. These strain gauges produce an electrical signal proportional to the magnitude of line tension. The wire always makes a complete 180 degree wrap around the tension wheel so rigup angle does not affect the tension measurement.

The tension wheel is mounted on a self aligning bearing which allows the wheel to properly align itself. This reduces any side forces that may be present which increases the tension measurement accuracy.

Additionally, a hydraulic load cell is included which measures wireline tension independently of the electronic load pin. It is mounted in the frame and measures the tension differential between the measuring wheel and the tension wheel.

1. PASSIVE LOW VOLTAGE

Power Requirement - 12 vdc excitation

Interface – None – passive bridge only

2. DIFFERENTIAL VOLTAGE

Power Requirements - +/– 15 vdc input power

Interface - Proprietary circuit board which amplifies the load pin signals and provides a 1.5v differential output.

0 vdc = 0 lbs (0 kg)
.75 vdc = 5,000 lbs (2,268) - shunt cal
1.5 vdc = 10,000 lbs (4,536 kg)

2.4.3 TENSION SPECIFICATIONS continued

3. 4-20MA CURRENT LOOP

Power Requirements - +24vdc input power

Interface - Proprietary circuit board which amplifies the load pin signals and provides a 4-20ma current loop output.

4 ma = 0 lbs (0 kg)
12 ma = 5,000 lbs (2,268) - shunt cal
20ma = 10,000 lbs (4,536 kg)

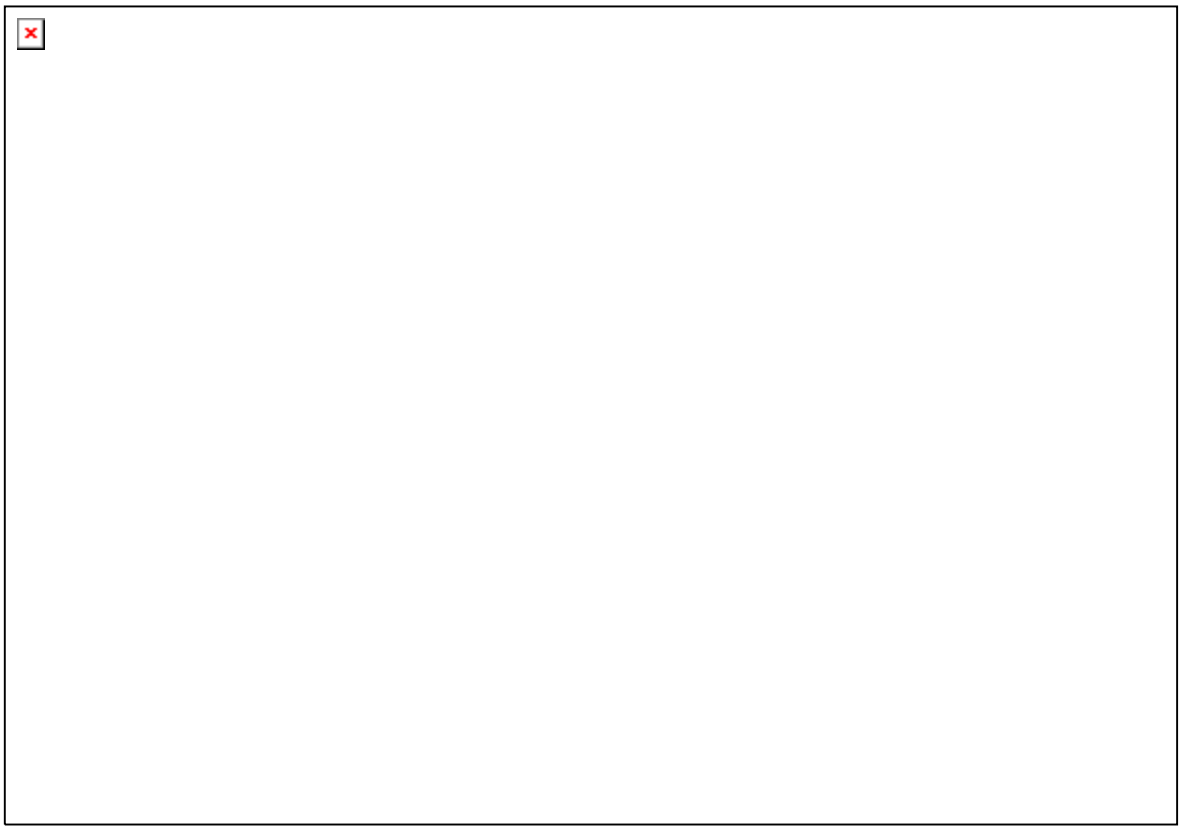
COMMON SPECIFICATIONS

Temperature Stability
<= .015% full scale / deg F on zero
<= .02% full scale / deg F on output

Accuracy 1% full scale nominal
Maximum Rated Load 9,000 lbs (4,082 kg)

2.4.4 GENERAL SPECIFICATIONS

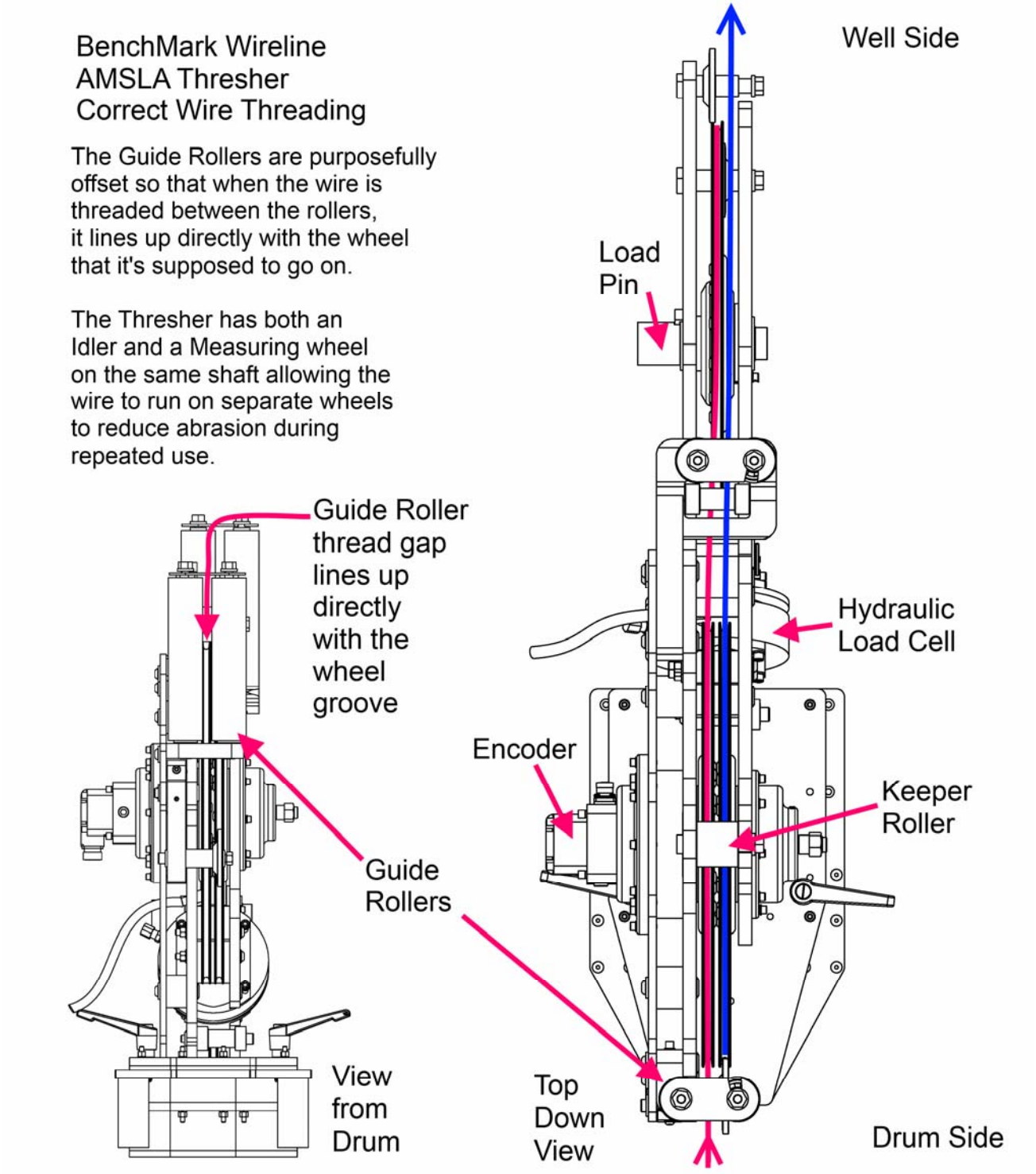
Height:	39.16”	.994 m
Width:	51.99”	1.320 m
Depth:	12.79"	.324 m
Weight:	350 lbs	158.75 kg
Maximum Tension:	15,000 lbs	6,803 kg
Line Sizes:	.092" – 5/16”	2.33 mm – 7.93 mm
Encoder:	1,200 PPR , others available	
Backup Counter:	4 PPR Quadarature	
Load Pin:	Passive low voltage	
	Differential voltage	
	4-20ma current loop	



2.5 HARDWARE FEATURES

- **Cable sizes** .092 to .125 slickline & 3/16" to 5/16" e-line/braided line
- **Tension load axle** & amplifier can be configured to different outputs
- **3 fully independent depth measurements** - 1. mechanical counter 2. optical encoder 3. magnetic pickup
- **Backup depth system** – reduces drag on measuring wheel by eliminating mechanical drive cable
- **Encoder & tension amplifier** certified for Zone II area use
- **Anodized aluminum frame** – all steel parts are plated or SST
- **Line removal** from the side without cutting off Cable Head
- **Minimizes wire abrasion & fatigue** by using non-reverse bend configuration
- **Separate measuring and idler wheels** completely eliminates wire rub
- **Large diameter wheel** radius minimize wire fatigue
- **Spooling rollers** and pressure wheels keep wire in wheel at low/no tension
- **Sprung pressure wheel** keeps wire turning with wheel even with sudden direction change or jarring action
- **Top mount configuration** on a 40mm overhead spooling bar
- **Hydraulic Load Cell** provides second independent tension measurement

2.6 USER INTERFACE FEATURES


BenchMark Wireline
AMSLA Thresher
Correct Wire Threading
The Guide Rollers are purposefully offset so that when the wire is threaded between the rollers, it lines up directly with the wheel that it's supposed to go on.
The Thresher has both an Idler and a Measuring wheel on the same shaft allowing the wire to run on separate wheels to reduce abrasion during repeated use.
Guide Roller thread gap lines up directly with the wheel groove
Guide Rollers
View from Drum
Well Side
Load Pin
Hydraulic Load Cell
Encoder
Keeper Roller
Top Down View
Drum Side

2.6.1 SLICKLINE WIRE THREADING – WITH & WITHOUT CABLE HEAD

The Thresher measuring head can be threaded either with or without the cable head attached. These images show a wire without a cable head but the same procedure can be used for a wire with the cable head attached by threading from the side and top around the rollers.

Loosen the screws on both sets of guide rollers only if the cable head is attached. Swing the guide roller plate away leaving top access to the space between the guide rollers.

Loosen the keeper roller, move it to the top of its slot and retighten the screw.

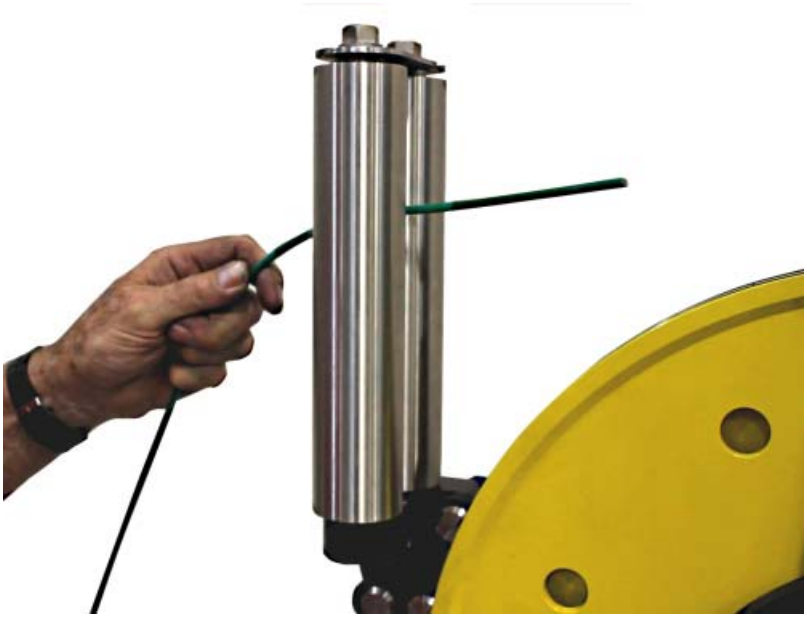
2.6.1 SLICKLINE WIRE THREADING - WITH & WITHOUT CABLE HEAD continued

Loosen the upper pressure roller, move it to the end of its slot and retighten the screw.

Loosen the lower pressure roller, move it to the end of its slot and retighten the screw.

2.6.1 SLICKLINE WIRE THREADING - WITH & WITHOUT CABLE HEAD continued

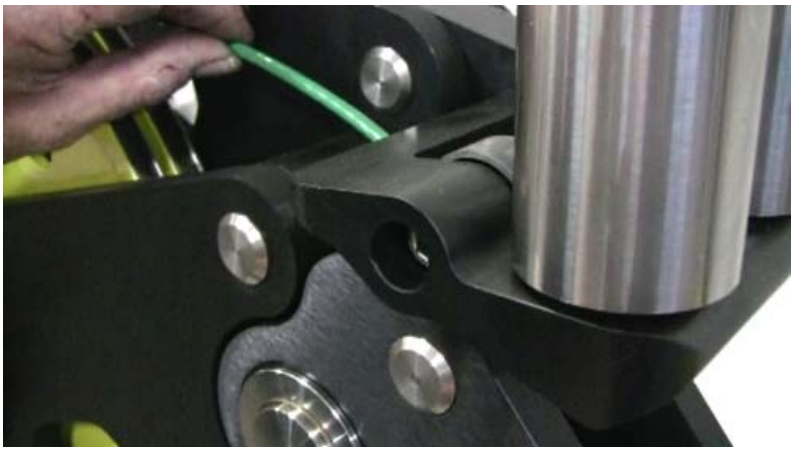
Thread the wire between the 1st set of guide rollers then over the top of the idler wheel.



The idler wheel is the one on the encoder side of the measuring head and lines up directly with the gap between the guide rollers.

2.6.1 SLICKLINE WIRE THREADING - WITH & WITHOUT CABLE HEAD continued

Feed the wire under the guide roller plate spacer.



The wire then goes over the top of the tension wheel.

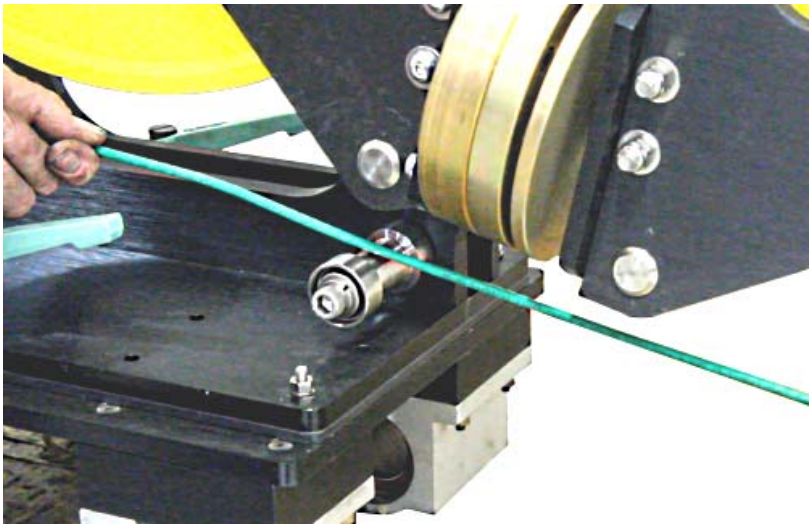
2.6.1 SLICKLINE WIRE THREADING - WITH & WITHOUT CABLE HEAD continued

It then goes around the back of the wheel under the upper pressure roller.

It continues around the bottom of the wheel under the lower pressure roller.

2.6.1 SLICKLINE WIRE THREADING - WITH & WITHOUT CABLE HEAD continued

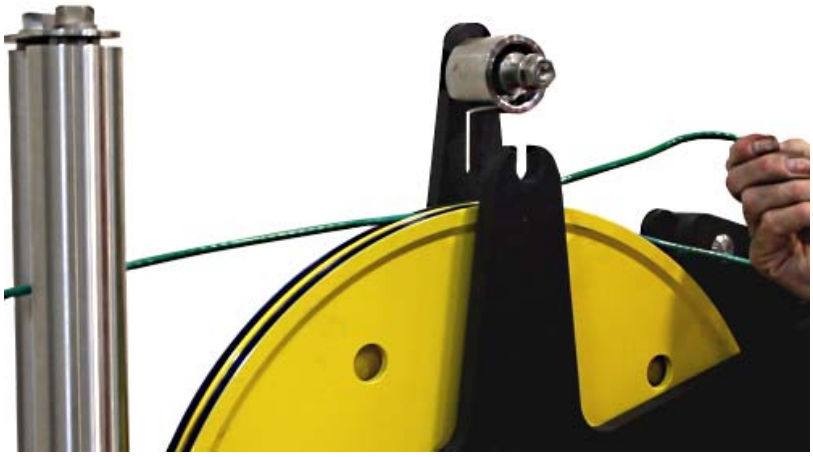
The wire now goes from the underside of the tension wheel to the underside of the measuring wheel, above the lower keeper roller. The measuring wheel is the one closed to you.



Use a ¾" open end wrench to spring the pressure roller arm away from the measuring wheel and thread the wire between the pressure roller and the measuring wheel groove.

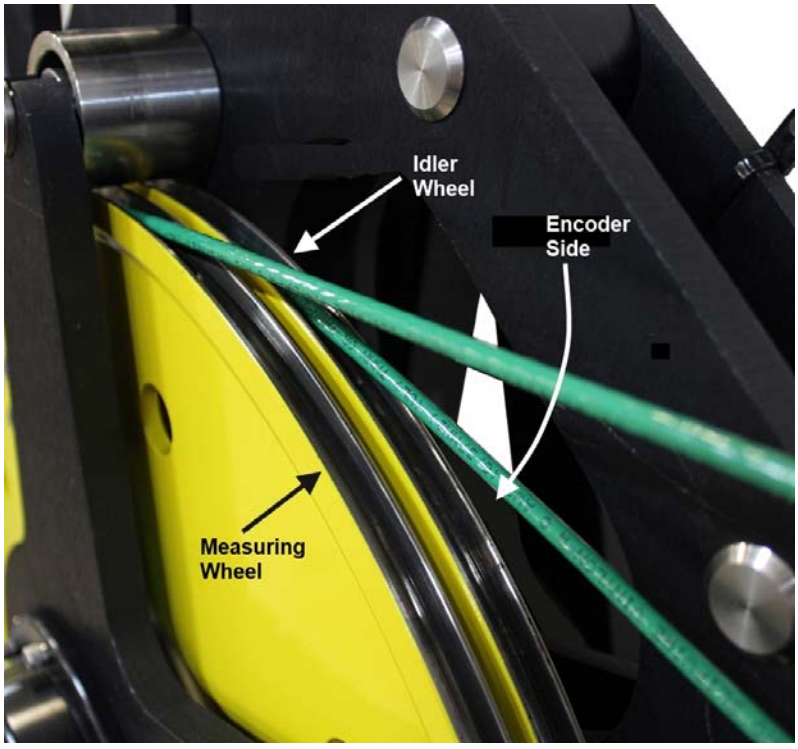
2.6.1 SLICKLINE WIRE THREADING - WITH & WITHOUT CABLE HEAD continued

Note – make sure that the wire is in the groove of the measuring wheel, (the one closest to you), and not the groove of the idler wheel.



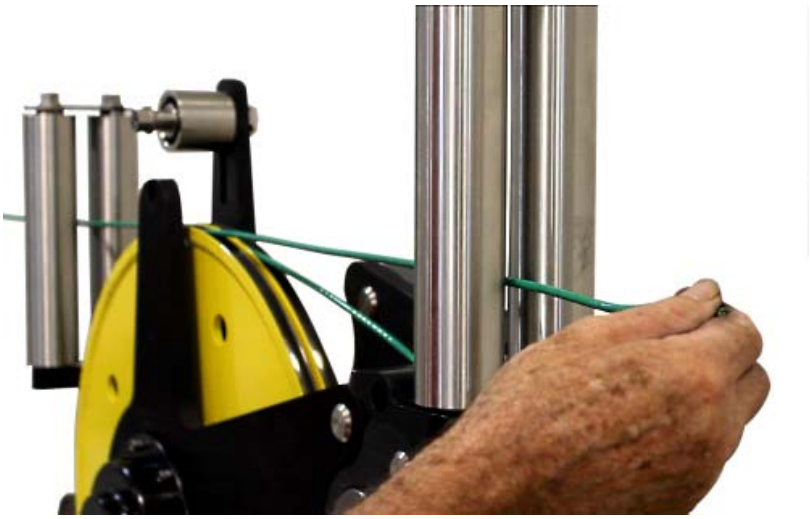
Now thread it over the top of the measuring wheel.

Example – this is how the wire should look when properly threaded.



2.6.1 SLICKLINE WIRE THREADING - WITH & WITHOUT CABLE HEAD continued

Run the wire out through the gap between the other guide rollers.

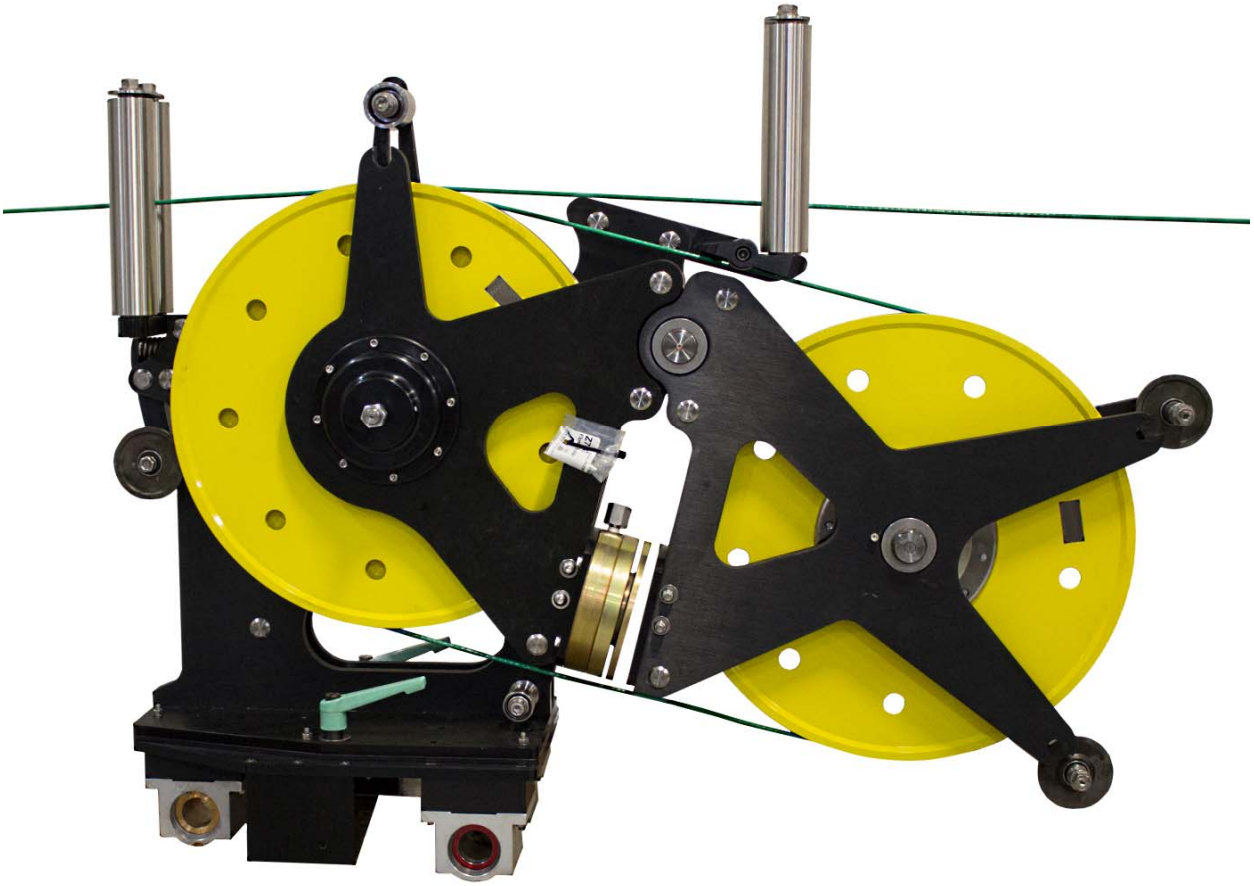


Now reposition the two keeper rollers and the two pressure rollers back in their slots and tighten the screws.

Note – the two pressure roller need to be in the slot of the tension wheel. Avoid adjusting them with too heavy a contact with the tension wheel. If they are too close they can bind and give false reading.

2.6.1 SLICKLINE WIRE THREADING - WITH & WITHOUT CABLE HEAD continued

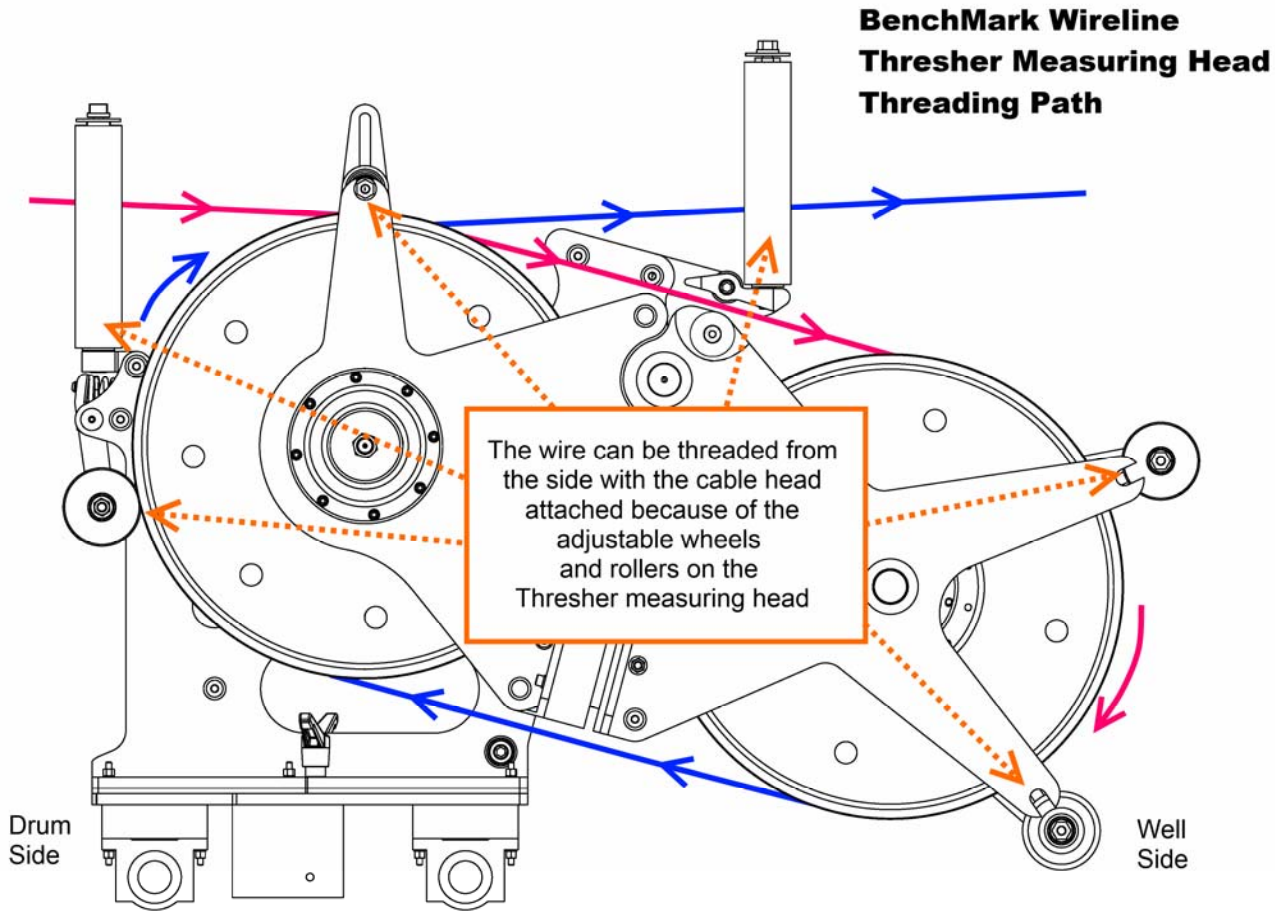
This is what the Thresher should look like then properly threaded.



2.6.2 SLICKLINE WIRE THREADING – FINAL RESULT

This is what an Orca measuring head should look like with the wire properly threaded.

Final thread path is the same whether threaded with or without cable head attached.


BenchMark Wireline
Thresher Measuring Head
Threading Path
The wire can be threaded from the side with the cable head attached because of the adjustable wheels and rollers on the Thresher measuring head
Drum Side
Well Side

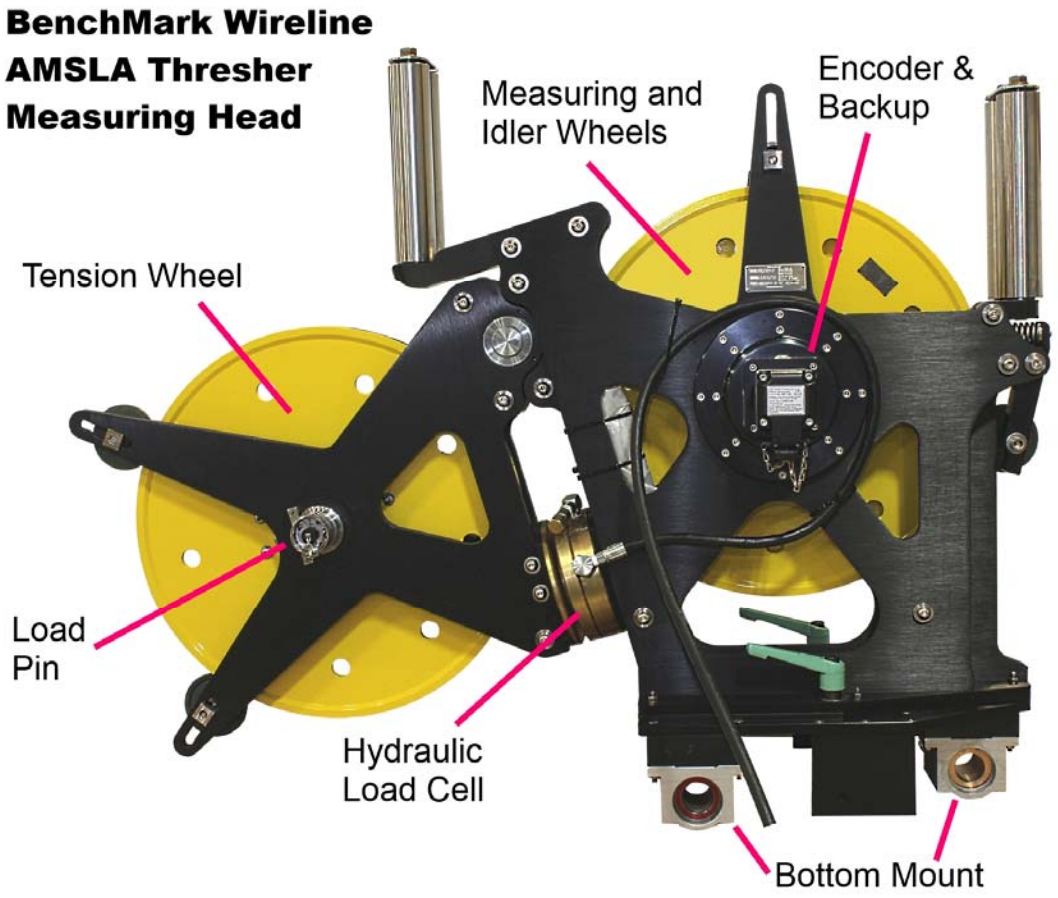
2.7 HAZARDOUS AREA INSTALLATION STANDARDS & REQUIREMENTS

This equipment is to be installed only by personnel who are suitably trained and qualified to local/national codes.

1. Install the measuring head on the wireline equipment.
   Bolt the mounting bracket to the wireline equipment.
   Connect the measuring head to the mounting bracket.

2. Connect the cables from the panel to the encoder, backup and load pin on the measuring head.

Make sure you use the correct cable for each connection as described in this manual.



2.8 OBTAINING TECHNICAL ASSISTANCE

Call BenchMark Wireline Products Inc. at +1 281 346 4300
Or contact by email mail@benchmarkwireline.com
Or fax in request at +1 281 346 4301

Information is also available on website www.benchmarkwireline.com

Parts can be ordered by email, phone, or fax.

Equipment can be returned for repair and maintenance.
Please notify us by Phone, email, or fax before sending any equipment.

To return equipment to BenchMark, ship it to:
BenchMark Wireline Products
36220 FM 1093
Simonton, Texas 77476
U.S.A.

Note – For better response, please have the Part Number available.

3.0 SOFTWARE OPERATING INSTRUCTIONS

NOTE - The measuring heads do not contain any software. The software is in the display panel. A variety of display panels can be used with this measuring head.

To view the Software Operating Instruction, refer to the manual for the Display Panel being used with this head.

4.0 SOFTWARE UPDATE PROCEDURES

NOTE - The measuring heads do not contain any software. The software is in the display panel. A variety of display panels can be used with this measuring head.

To view the Software Update Procedures, refer to the manual for the Display Panel being used with this head.

5.0 MAINTENANCE, ASSEMBLY DRAWINGS & PARTS LIST

5.1.1 PRE AND POST JOB CHECKS

Between jobs, check the measuring and guide wheels for looseness, play, out-of-roundness, worn or rough sounding bearings, or other mechanical conditions that could affect measurement accuracy.

Visually inspect the interiors of the electrical connectors for the encoders and electronic load axle for dirt and evidence of insulation breakdown. Clean or replace as necessary. Install dust caps on the connectors if the cables are removed.

Manually rotate each wheel by hand to verify its condition. Inspect the depth measuring wheel for signs of abnormal wear diameter changes, or shaft play that can affect measurement accuracy. The wheel should be replaced if it is grooved more than .005".

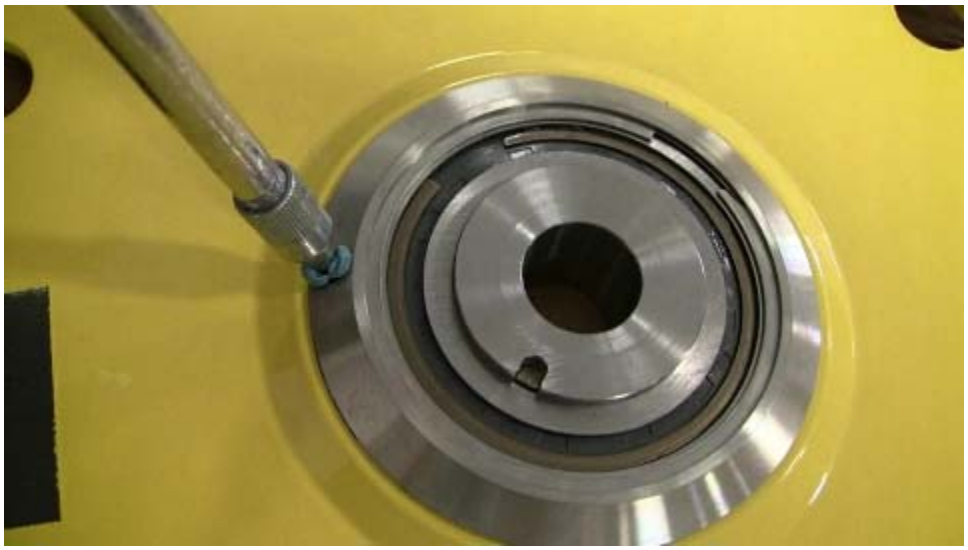
Inspect the tension wheels for signs of abnormal wear, diameter changes, or shaft and bearing play that could affect measurement accuracy. It should also be replaced if it is grooved more than .005".

Do not pressure wash bearings or electrical parts

5.1.2 LUBRICATION

Lubrication – use waterproof marine grease and a straight necked grease gun. Use the grease nozzle that comes with the measuring head (in the small plastic bag zip-tied to the frame).

Press the nozzle into the fitting and apply 3 squirts. Repeat same lubrication schedule each month.



DO NOT pressure wash the machine as it will force the grease out of the bearings and they will fail.

5.2 FIELD MAINTENANCE PROCEDURES

TENSION WHEEL MAINTENANCE

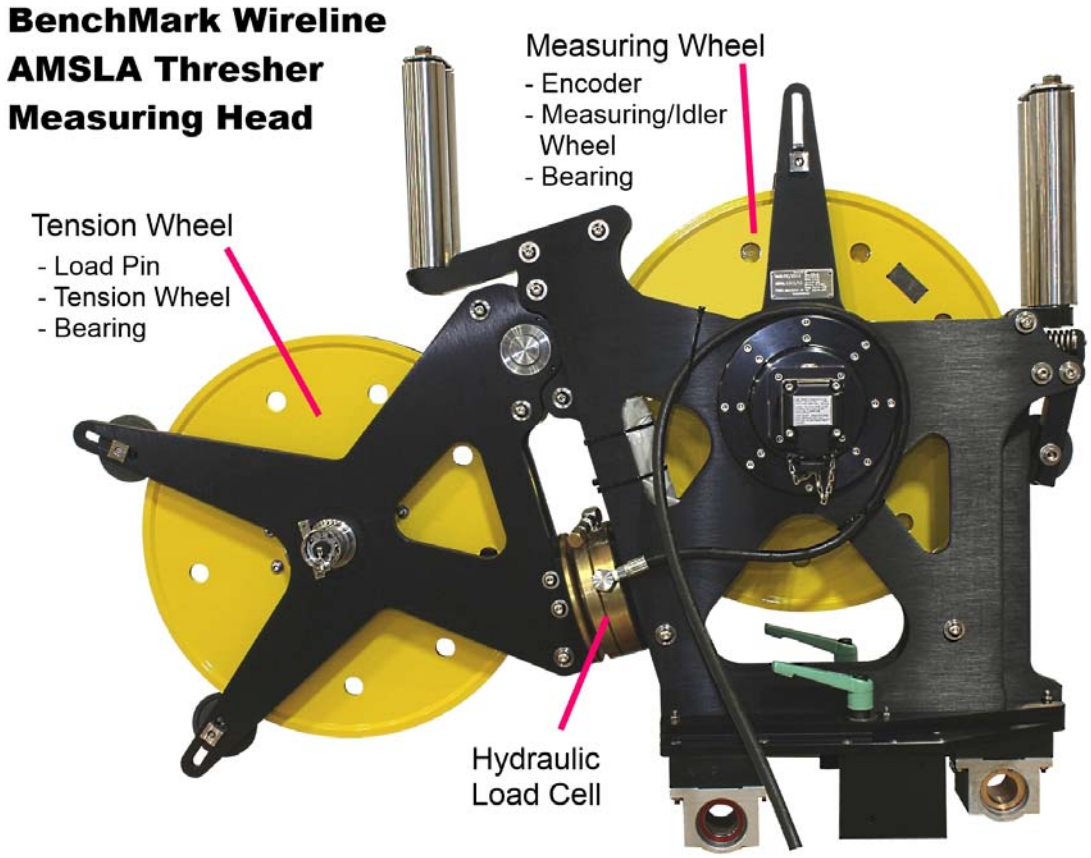
There are 3 field maintenance procedures for the Tension Wheel.

- Load Pin Replacement – 5.2.1
- Wheel Replacement – 5.2.2
- Wheel Bearing Replacement – 5.2.3
- Hydraulic Load Cell Replacement – 5.2.4

MEASURING WHEEL MAINTENANCE

There are 3 field maintenance procedures for the Measuring Wheel.

- Encoder Replacement – 5.3.1
- Wheel Replacement – 5.3.2
- Wheel Bearing Replacement – 5.3.3



5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT

The 1st step is to remove the spiral lock from the load pin shaft.
If the lock has not been damaged it can be used again on reassembly.

Hold the tension wheel with one hand.

5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT continued

Gently remove the load pin from the wheel hub.
The load pin shaft holds the tension wheel in place.

With the load pin removed gently let the tension wheel rest in the frame.

Put anti-seize compound on shaft of the new load pin.

5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT continued

Position the tension wheel so that the load pin can be placed through the wheel hub.

Note that the load pin has a flat notch on one side.

5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT continued

The flat side of the load pin will flange up to the guide plate on the frame.

Insert the load pin and rotate it so that the flat side of the pin butts up to the guide plate.

5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT continued

The bushing in the tension wheel bearing has a slot for an anti rotation screw.

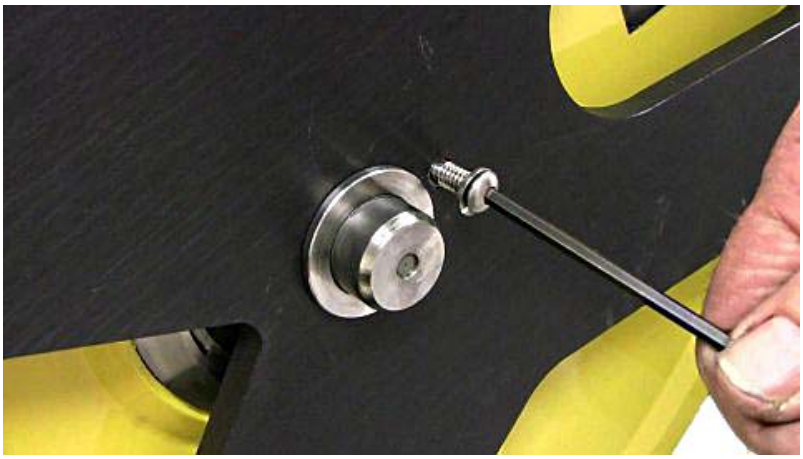
*Note - depending on position of the wheel, if during this procedure the tension wheel stays in place, there is no need to remove the anti rotation screw.

If the wheel moves too much, the bearing may slide off the anti-rotation screw. In that case you must remove the anti-rotation screw for proper reinstallation.

5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT continued

Spin the wheel until the anti rotation slot on the bearing can be seen through the anti rotation screw hole.

Replace the anti rotation screw and tighten it firmly.



5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT continued

Replace the spiral lock.

5.2.2 TENSION WHEEL - WHEEL REPLACEMENT

For this maintenance, we assume that the load pin has been removed. 5.2.1

Loosen and completely move the pressure roller to the end of its slot and retighten.

Pull the wheel up and out of the frame.

If bearing replacement is needed see 5.2.3

Reposition the wheel back in the frame and follow the load pin installation instructions in 5.2.1.

Then replace and adjust the pressure roller.

5.2.3 TENSION WHEEL - BEARING REPLACEMENT

For this maintenance, it is assumed that the tension wheel has been removed. The bearing is held in the wheel hub by 2 snap rings. Remove the rings and push the bearing out.

An Arbor press is being used to demonstrate this replacement.

5.2.3 TENSION WHEEL - BEARING REPLACEMENT continued

An anti-rotation bushing will be pressed into the new bearing. Place the new bearing on the press.

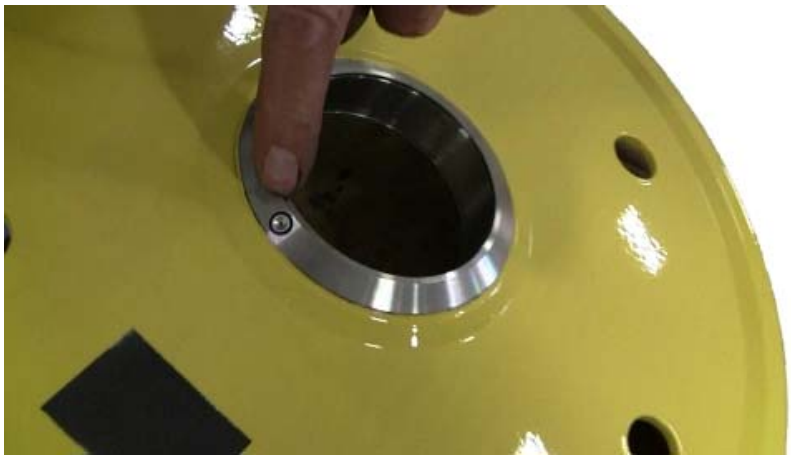
On the first stroke, the bushing may not go all the way into the bearing. Add a spacer on the bottom of the bearing as the bushing will protrude below the bottom bearing.

5.2.3 TENSION WHEEL - BEARING REPLACEMENT continued

The bushing is properly installed when approximately equal amounts stick out both above and below the bearing assembly.

5.2.3 TENSION WHEEL - BEARING REPLACEMENT continued

Take the Tension Wheel. 2 snap rings will hold the bearing assembly in place. The front of the wheel is the side with the grease fitting.



On the BACK of the wheel, install the 1st snap ring.

5.2.3 TENSION WHEEL - BEARING REPLACEMENT continued

Then turn the wheel over. You should be able to simply insert the bearing assembly into the center hub.

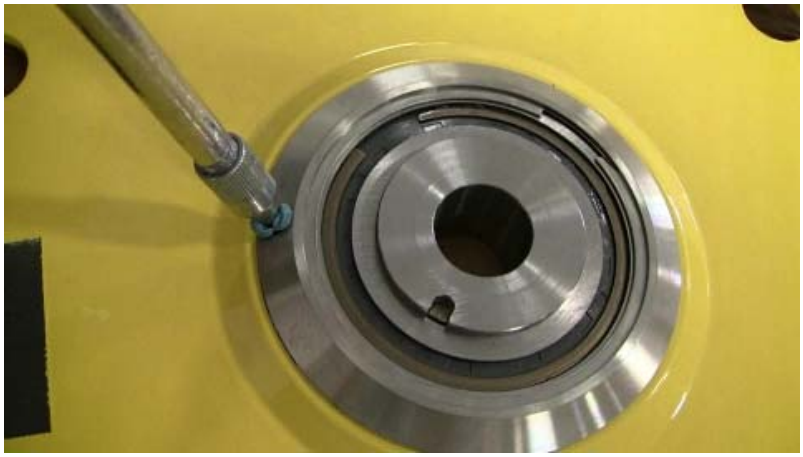
Install the 2nd snap ring to hold the bearing in place.

5.2.3 TENSION WHEEL - BEARING REPLACEMENT continued

Manually tug on the bearing assembly to make sure it is firmly in place.

Lubrication – use waterproof marine grease and a straight necked grease gun. Use the grease nozzle that comes with the measuring head (in the small plastic bag zip-tied to the frame).

Press the nozzle into the fitting and apply 3 squirts. Repeat same lubrication schedule each month.

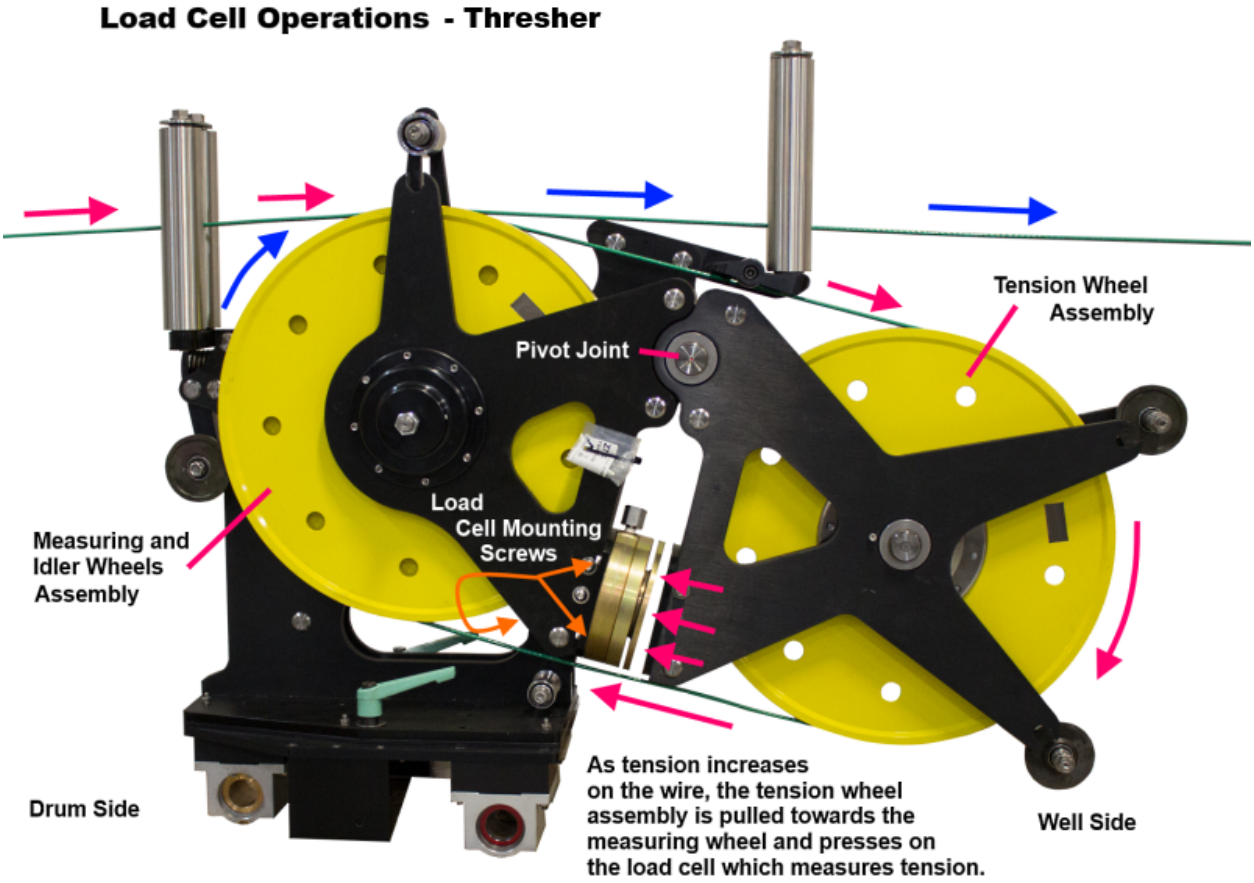


DO NOT pressure wash the machine as it will force the grease out of the bearings and they will fail.

5.2.4 LOAD CELL REPLACEMENT

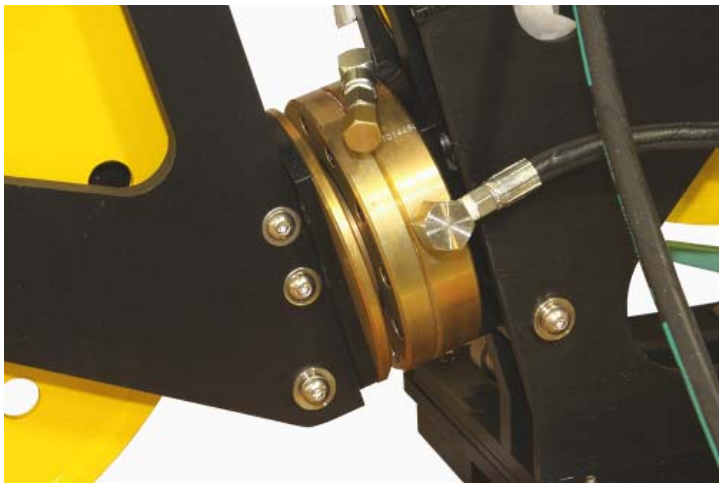
The Thresher measuring head has a pivot joint that connects the measuring wheel assembly to the tension wheel assembly. The hydraulic load cell is placed between those two assemblies. Because of the circular wire path, as tension is added to the wire, it will pull the tension wheel assembly towards the measuring wheel thus exerting pressure on the load cell.

The load cell is screwed to the measuring wheel side of the frame and it rests against a flat mounting plate on the tension wheel side.

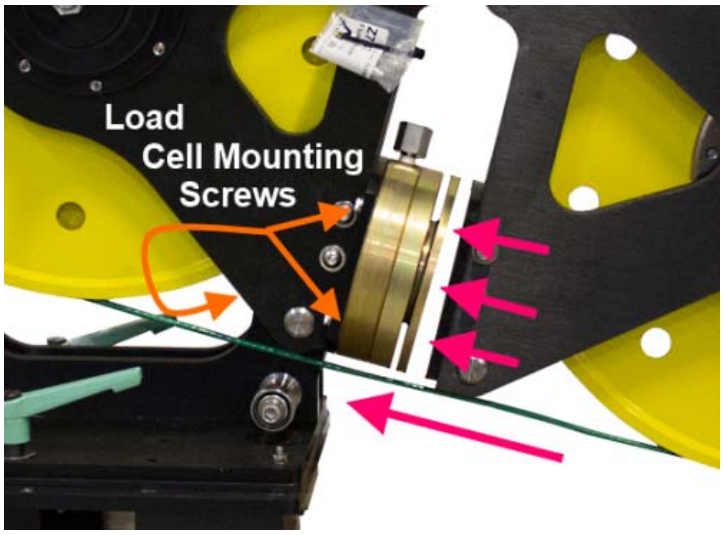

Load Cell Operations - Thresher
Tension Wheel Assembly
Pivot Joint
Load Cell Mounting Screws
Measuring and Idler Wheels Assembly
Drum Side
Well Side
As tension increases on the wire, the tension wheel assembly is pulled towards the measuring wheel and presses on the load cell which measures tension.

5.2.4 LOAD CELL REPLACEMENT continued

The Hydraulic Load Cell is an additional tension measuring device independent of the load pin.



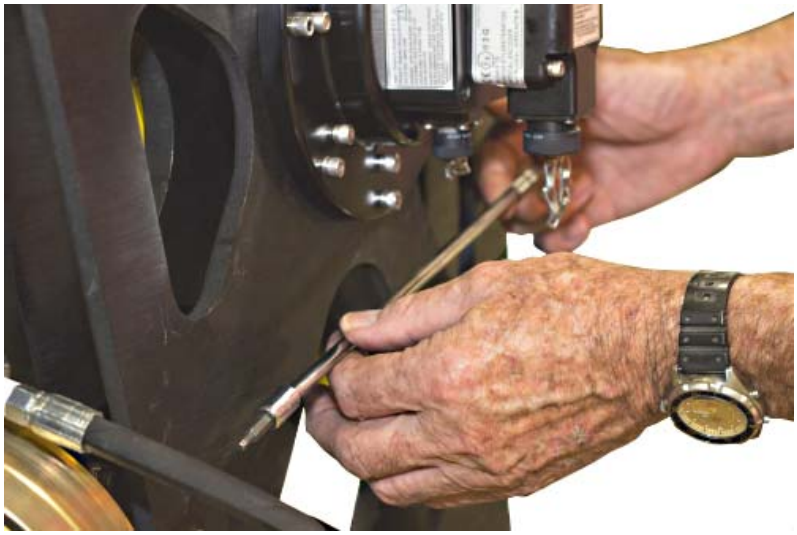
To replace the load cell, two screws which run through the mounting plate up into the bottom of the load cell and a deeply recessed screw need to be removed.



5.2.4 LOAD CELL REPLACEMENT continued

First remove the recessed screw. For this task a ¼ inch drive with an 8 to 10 inch extension will work the best and a flexible connection on the extension is also helpful.

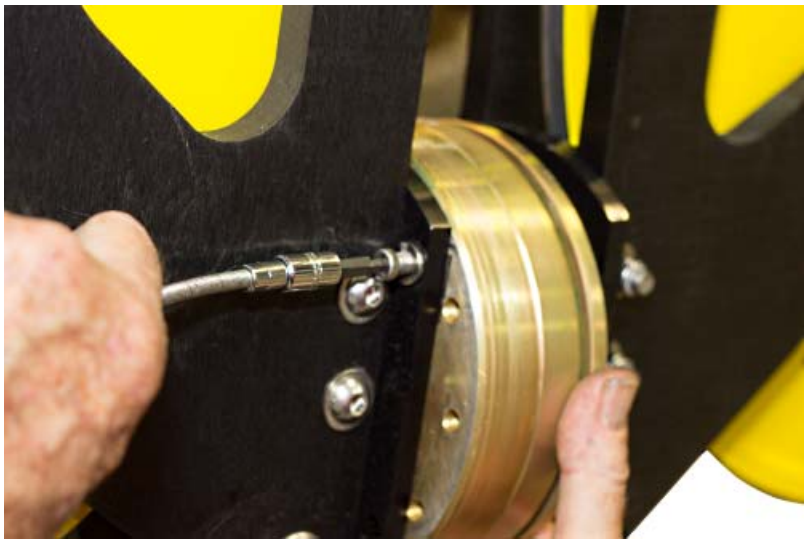
The screw is accessed by putting the extension in the position shown “between the frame and the idler wheel” behind the encoder as shown in the picture.



Then attach a ratchet to the extension, loosen and remove the screw and remove the extension and socket.

5.2.4 LOAD CELL REPLACEMENT continued

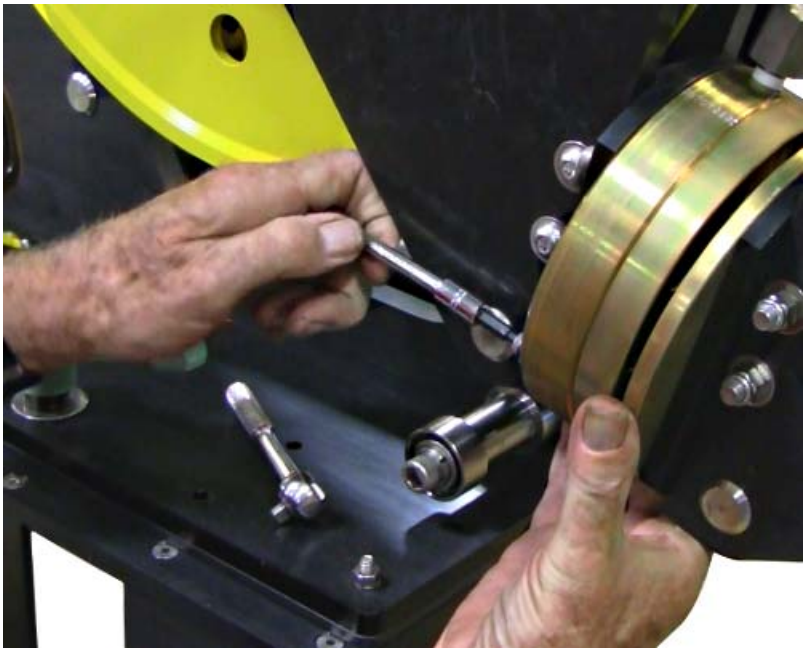
Now remove the other two screws that go from the mounting plate into the load cell. A flex spring extension can be very helpful for this procedure.



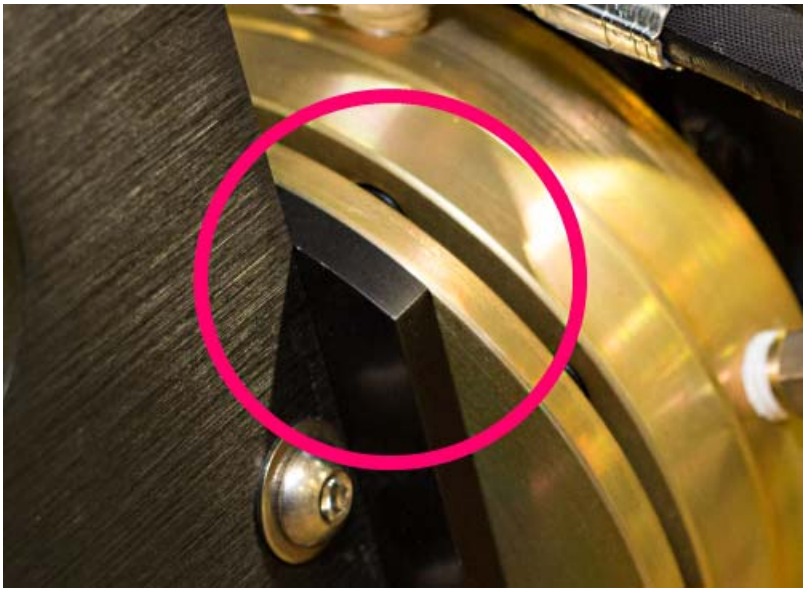
As soon as the last screw is removed the load cell will usually drop from the mounting plate.

5.2.4 LOAD CELL REPLACEMENT continued

Take the new load cell with the hydraulic hose attached and reposition it the same as the one that was removed. Replace the three screws but do not fully tighten them.



Note that the mounting plate has a curved edge matching the radius of the load cell.



5.2.4 LOAD CELL REPLACEMENT continued

Position the load cell so that the edge of the cell aligns with the edge of the mounting plate. Tighten the three screws to hold the load cell in place.

If necessary, use a soft hammer to nudge the cell into the proper position.

5.2.4 LOAD CELL REPLACEMENT continued

Now firmly tighten all screws

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT

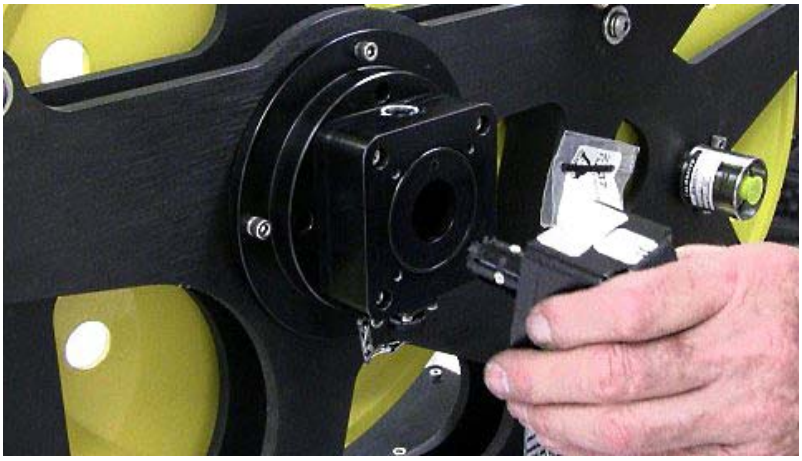
NOTE – the process for replacing encoders on all AMSLA measuring heads is the same. Though the measuring head in this example is positioned vertically, the steps demonstrated are the same.

The first step is to remove the Plug.
The plug covers an access hole used to maintain the equipment.

Next remove the 4 encoder screws.
Hold the encoder as the last screw is removed or it will fall from the adapter body.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Carefully pull the encoder straight out avoiding contact between the couplings and the adapter.



If the plastic coupling is attached to the coupling stack, remove it.
If it is still inside the adapter body, with a pair of needle nose pliers reach in & extract it.

*Note - If you drop the plastic coupling inside the adapter, you may have to remove the adapter to retrieve it.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Carefully remove the O Ring.

Note the size of the gap between the coupling and the encoder body.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

With the small Allen wrench, loosen the 2 set screws that hold the coupling on the shaft of the encoder.

Remove the coupling stack from the shaft.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Replace the existing coupling stack on the shaft of the new encoder.
Note that the shaft has a flat side. Place the coupling on the shaft so that the tangs on the coupling and one set screw are aligned to the flat side of the shaft.

When tightening, leave the same gap on the shaft between the coupling and the encoder. Snug up but DO NOT fully tighten the set screw on the flat side of the shaft.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Use DC111 or equivalent and apply a thin layer to the plastic coupling.
Press the plastic on top of the coupling stack. The DC111 will temporarily hold it in place.

The top of the encoder has the OEM labels. Rotate the coupling stack so that the slot on the top of the plastic coupling is oriented vertically.

Look though the hole in the adapter body and you will see the coupling half.
Rotate the measuring wheel so that the tang on the coupling half is vertical.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Carefully replace the encoder watching to not jar the coupling stack.
Hold it against the adapter body.

Using a flashlight look in the hole to verify that the plastic coupling has engaged the tang on the measuring wheel.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Temporarily replace the 2 screws to hold the encoder and coupling in place.

Place the Allen wrench in a set screw hole and exerting force, lever the coupling stack away from you towards the measuring wheel, snug up the set screw.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Remove the temporary screws remembering to hold on to the encoder.
Carefully remove the encoder taking care to not jar the coupling stack.

Firmly tighten the 2 set crews on the coupling.

Lubricate the O ring using the DC111 and carefully replace the O ring in the adapter body.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Position the coupling on the encoder so that the slot is vertical.

Carefully position the encoder in the adapter body.

Holding the encoder firmly in place, Rotate the measuring wheel and if properly engaged, as you look down through the plug hole, you should see the white dots on the coupling stack move as the coupling spins.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Replace the 4 screws and tighten them firmly.

The last step in the process is to replace the plug.
Put a half a bead of Teflon sealant on the leading threads of the plug.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

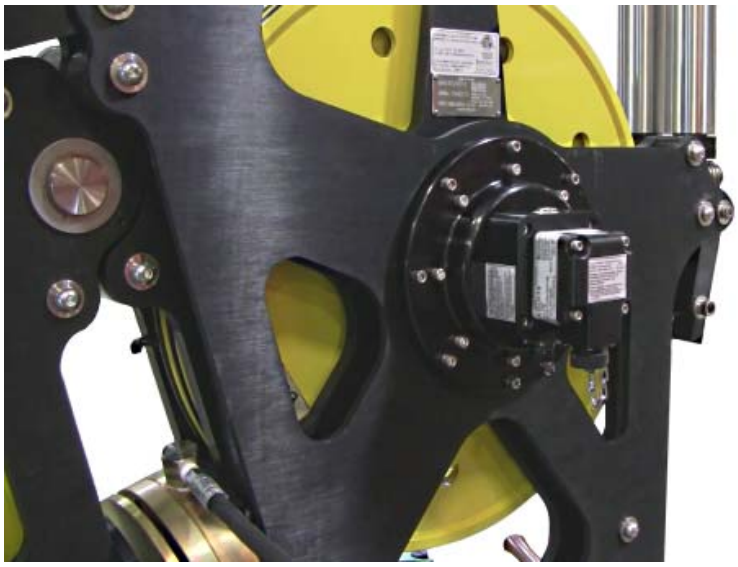
Replace the plug and tighten it firmly.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT

NOTE – during the process of changing the measuring and idler wheels as shown in this tutorial, the encoder will be removed and then reinstalled. It is assumed that the same encoder will be reinstalled so the process for changing the coupling stack is not shown. If you will be installing a NEW ENCODER during this procedure, refer to 5.3.1 for details on changing the coupling stack.

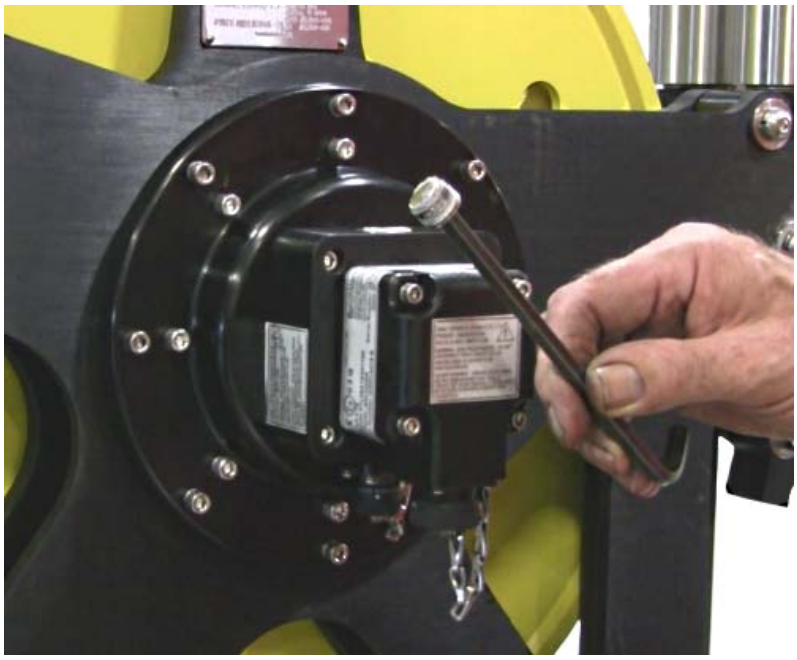
The Thresher measuring head weighs approximately 350 pounds. Take extreme care in moving this device. During this process it will be moved several times.

To begin with the Thresher will be left in an upright position. Take precautions that it does not fall over during this maintenance and possibly injure personnel or damage the machine.



5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

The first step is to remove the Plug. The plug covers an access hole used to maintain the equipment.



Then remove the 4 screws that hold the encoder in place. Then pull the encoder straight out and try to avoid impacting the encoder coupling with the adapter body.

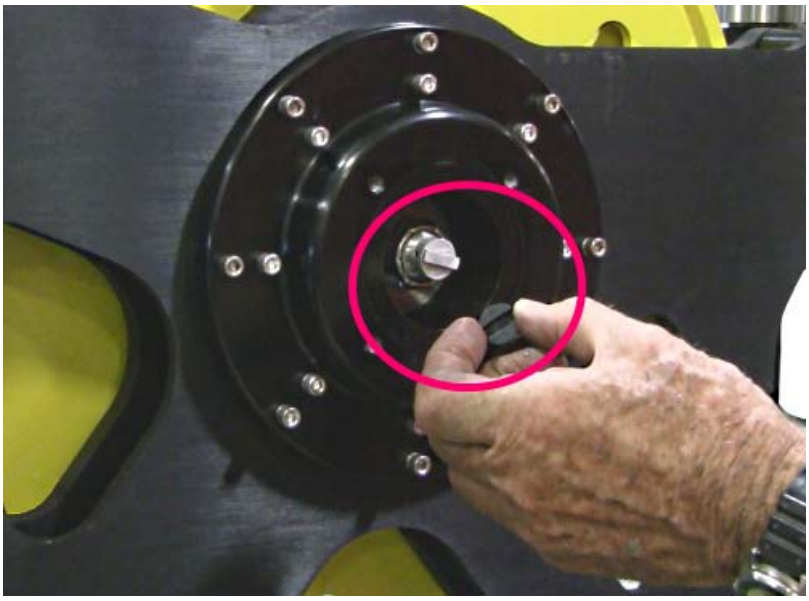
5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Now unscrew the 4 screws that hold the encoder adapter in place. You may need to tap the corner of the adapter with a hammer to loosen it, and then remove it.

The rubber o-rings may be reused if not damaged.

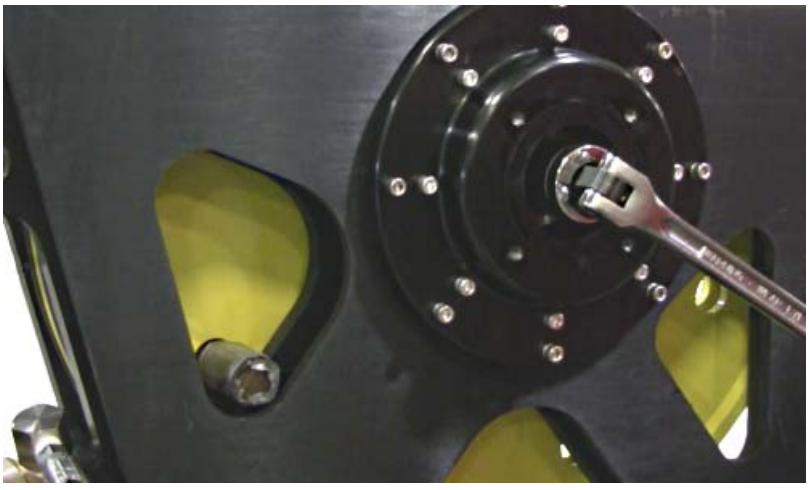
5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Now remove the black plastic encoder adapter coupling.



Line up the measuring and the idler wheels and insert a wooden dowel the thickness of a broom handle through the aligned holes and push the dowel down against the measuring head frame.

After using a 1 ¼ inch socket on the breaker bar to loosen the nut that holds the shaft in place, unscrew the nut past the nylon treads so that it can be turned with your fingers.

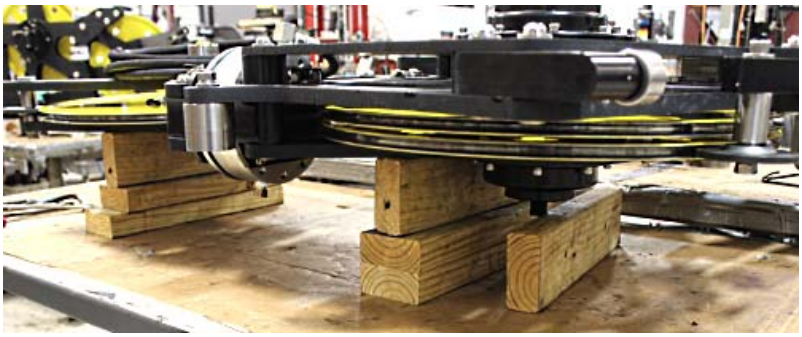


5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Remove all of the 16 screws on the hub.

Turn the Thresher head over with the encoder side down.

Make sure the measuring head is lying flat on a sturdy work table. 2x4 wooden blocks as shown in this image will hold it steady up off the table quite well.



5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Now completely remove the keeper roller.

Now remove the pressure roller. Using a ¾" Allen wrench and an 11/16" open end wrench remove the nut, screw, washer, spacer and wheel.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

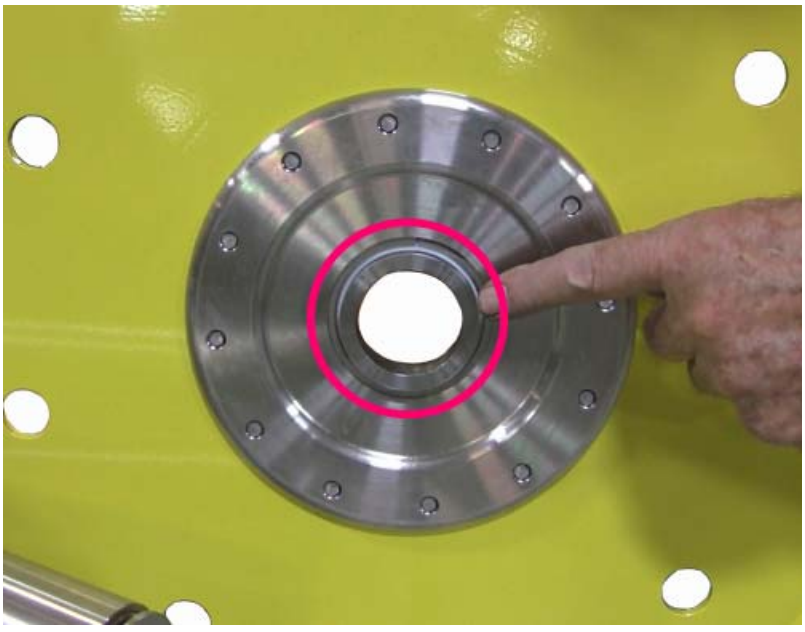
Place cardboard strips under the wheels.

Loosen and remove the 8 screws on the hub.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

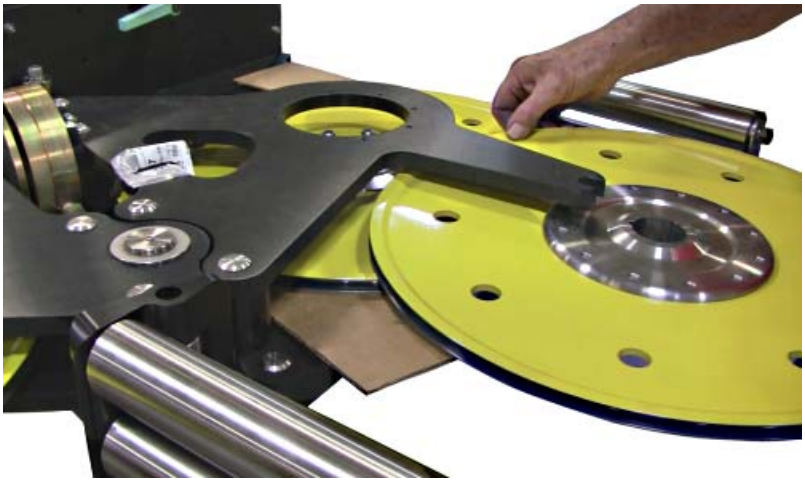
On the underside of the measuring head, remove the nut holding the shaft in place. The hub should fall out in your hands as you remove the nut. The top hub and shaft can now be easily pulled out. You may have to push up on the shaft from the bottom.

There is a bushing on the inner race of the in the wheel bearing of the bottom wheel, facing down. Normally it falls out when the hub and shaft are removed and both the measuring and idler wheels can be removed at the same time stacked on top of each other. If it does not fall out, then each wheel needs to be removed separately and then the bushing needs to be tapped out and reinstalled in the new wheel.



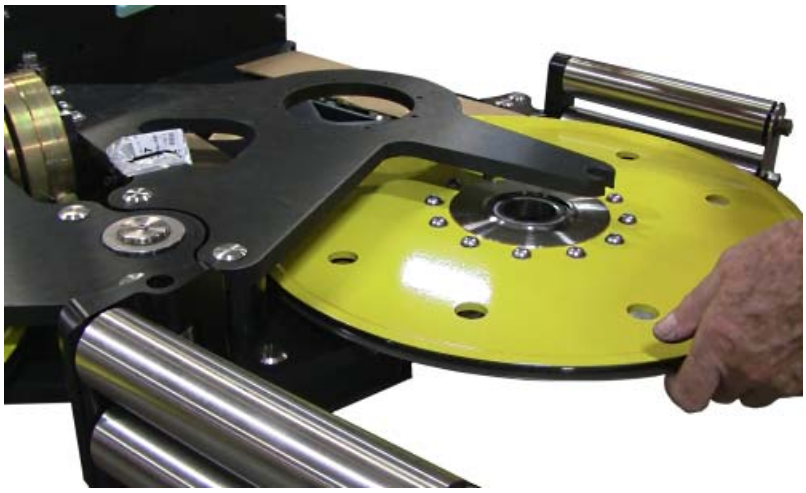
5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Now remove the wheels by sliding them out of the side of the frame as shown. Both may be removed at the same time if the bushing falls out. In this example, they are removed separately.



5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

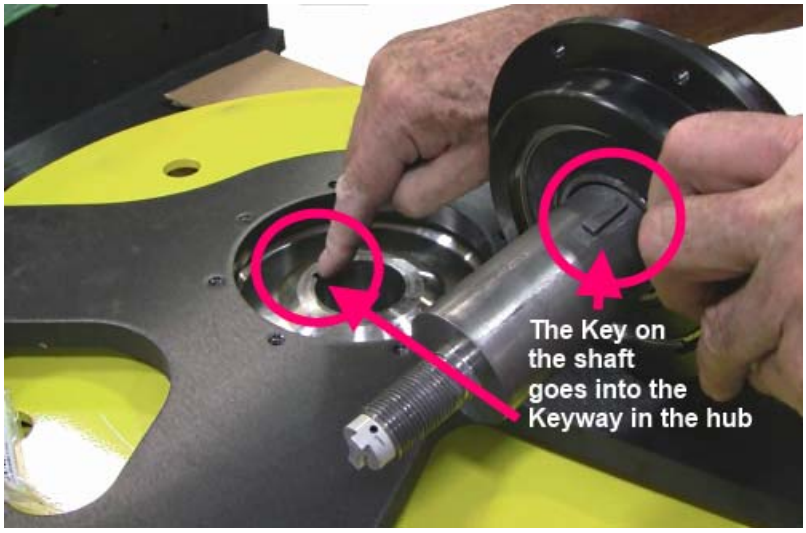
Now reinstall the replacement wheels with the bushing installed, in the same order they were removed.



When properly installed they wheels will drop down into the frame. Center the wheels in the frame hole.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

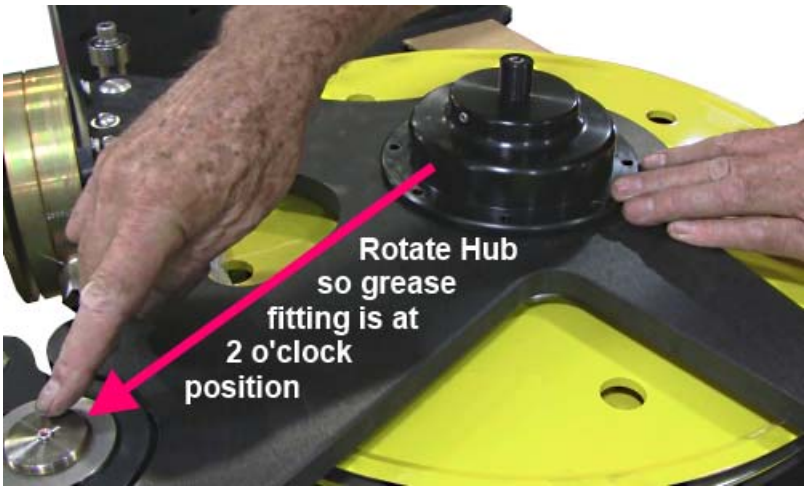
Reinstall the hub and shaft in the center of the wheels. Locate the key on the shaft and rotate the shaft so the key slides down into the keyway on the wheel hub. A flashlight will help you see the relative positioning of the key and keyway.



A flat headed screwdriver will allow the shaft to be rotated precisely and the shaft and hub to slide down into place. You may have to hold the wheel steady while turning the screwdriver.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Rotate the hub so that the grease fitting is at the 2 o'clock position. This will help to keep the fitting clean and dry.



Replace the 8 screws with lock washers on the hub. Snug but do not fully tighten the screws.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

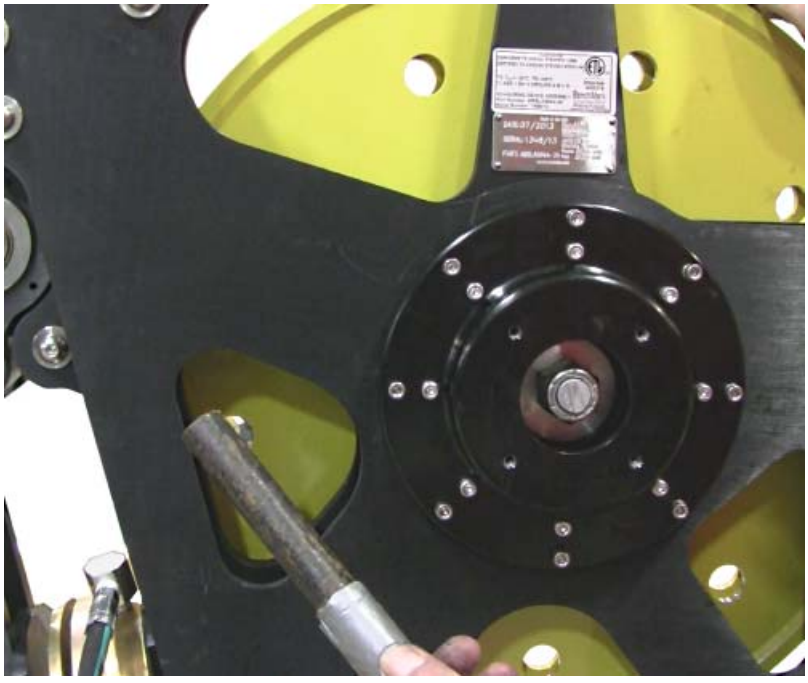
Replace and tighten the keeper roller.

Carefully stand the measuring head up into its vertical position again. Now push the hub into the frame from the nut side.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Make sure that the hub is rotated so that 2 of the inner ring screws are horizontal with the top of the measuring head and replace and tighten the 16 screws in the hub.

Line up the measuring and the idler wheels and insert a wooden dowel the thickness of a broom handle through the aligned holes.

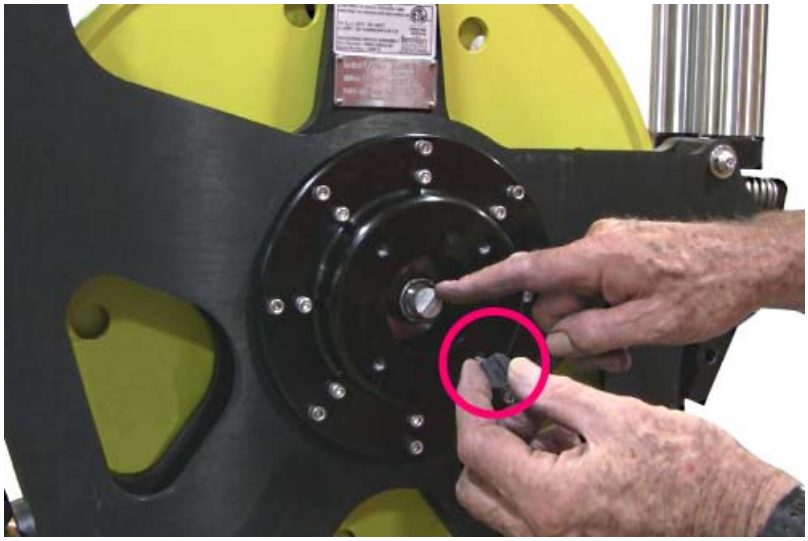


5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Rotate the wheels clockwise until the dowel is pushed up against the frame.
Now tighten the nut with the 1 ¼ inch socket and breaker bar. This will take 2 hands.
Remove the dowel. After tightening, re-test the yellow wheels to make sure that they spin easily in opposite directions without binding or touching.

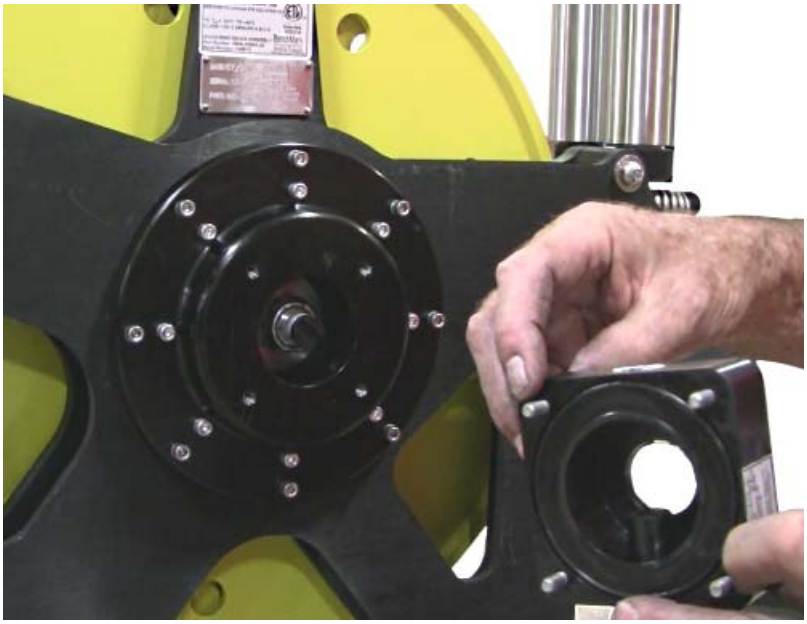
Now tighten the 8 screws in the hub on the other side of the measuring head.

Back on the encoder side replace the black plastic encoder adapter on top of the stack.
You may need to use DC111 on the bottom to temporarily hold it in place.



5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

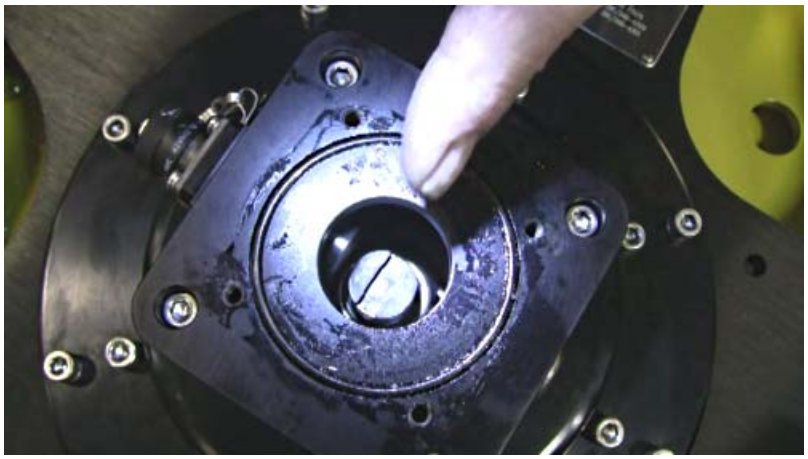
Before reinstalling the encoder adapter make sure the rubber o-ring is in the groove of the encoder adapter body and is positioned as shown. If necessary, lubricate the o-ring with DC111 or an equivalent.



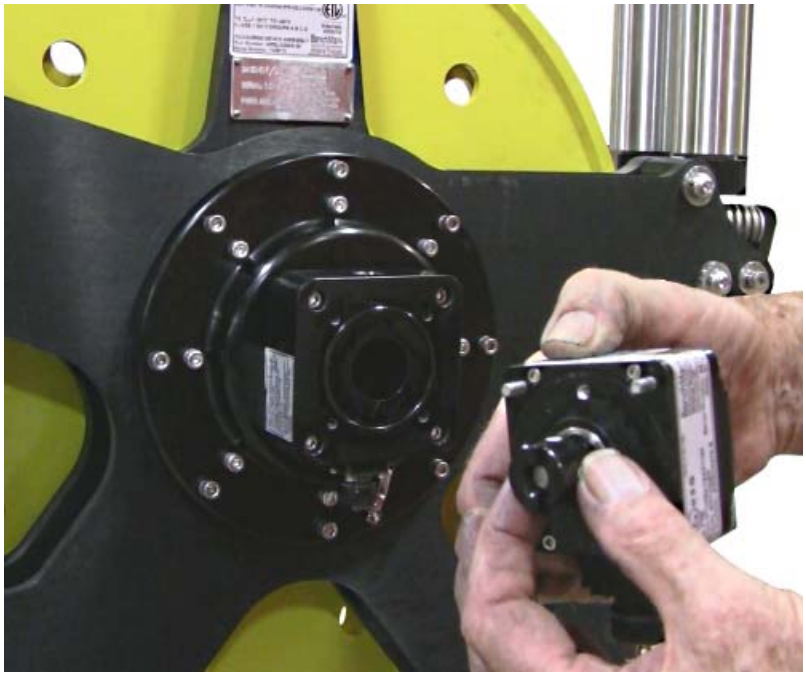
Place the encoder adapter on the hub with the backup connection facing down. Insert the 4 screws and lock washers and tighten firmly.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Rotate the measuring wheel to make sure that the encoder coupling on the frame inside the encoder adapter is rotated to vertical.



Rotate the coupling on the encoder to horizontal to match up with the coupling in the encoder adapter. Replace the encoder with the cable connection facing down. Insert and tighten the 4 screws on the encoder.



5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Shine a light through the plug hole and rotate the measuring wheel.

It the encoder is properly connected you will see the white dot on the encoder coupling moving in the hole as you rotate the measuring wheel.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Now reinstall the pressure roller. Connect a ¾ inch open end wrench to the end of the metal arm. Using the wrench as a lever, spring the arm away from the frame. Insert the screw and washer all the way through the hole in the control arm. Slide on the spacer and pressure roller with the tapered side towards the arm and the washer and nut. Make sure the roller is in the measuring wheel groove. The measuring wheel is the one on the right in this picture.

Tighten the nut and screw using a ¾" Allen wrench and an 11/16 wrench. If done properly the pressure wheel should turn with some effort and correspondingly the yellow measuring wheel should also turn.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Now you'll replace the plug. Put a half a bead of Teflon sealant on the leading threads of the plug.

Now replace plug and tighten firmly.

5.3.3 MEASURING WHEEL - BEARING REPLACEMENT

There are 2 bearings in the measuring wheel. 1 is on the shaft and the other is inside this hub. Both will need to be replaced.

Remove the retainer clip that holds the bearing in place in the hub. It can normally be removed and replaced with no special equipment.
Install the new bearing and the retainer clip.

5.3.3 MEASURING WHEEL - BEARING REPLACEMENT continued

The other bearing is on the shaft.
First remove the key from the shaft.

Now remove the retainer clip for this bearing.

5.3.3 MEASURING WHEEL - BEARING REPLACEMENT continued

You now need to press the shaft and the bearing out of the hub.
You will usually need a press to both remove and reinstall the bearing and shaft.
Set up your press to allow pressing the shaft and bearing out through the bottom of the hub.

Get a punch of smaller diameter than the shaft and press out the shaft.

5.3.3 MEASURING WHEEL - BEARING REPLACEMENT continued

Be sure to catch the shaft – clean off any lubricant on the bearing and shaft.

Protect the small threaded end of the shaft by putting a nut over it to press on. Press the shaft out of the bearing.

Place the new bearing on the shaft and snug as much as possible manually.

5.3.3 MEASURING WHEEL - BEARING REPLACEMENT continued

NOTE – make sure that the small lubrication hole on the outside bearing race is lined up with the grease fitting on the hub or the bearing won't be lubricated and will fail.

Place the shaft and bearing in the hub so that you can see the small end of the shaft protruding out of the hub…this will indicate that the shaft is properly aligned in the hub.

You will now press the bearing with the shaft in it, into the hub.

5.3.3 MEASURING WHEEL - BEARING REPLACEMENT continued

Verify that the shaft is properly aligned in the hub.
If the shaft spins easily, then it is properly installed.

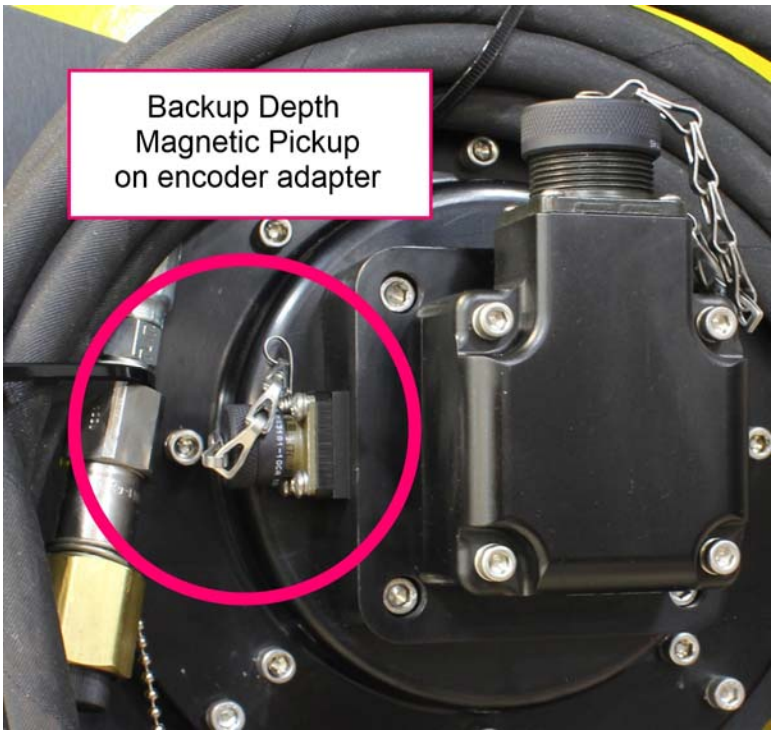
Now replace the key in the shaft.
The shaft is ready to be inserted in the wheel hub.

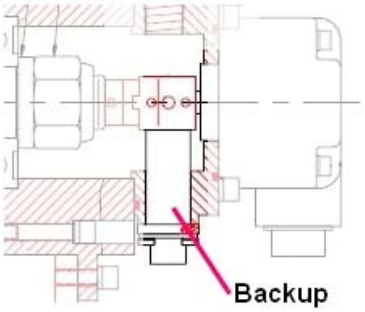
For instructions on reinstalling the shaft in the wheel, go to 5.3.2

5.3.4 BACKUP DEPTH MAGNETIC PICKUP REMOVAL AND INSTALLATION

The backup depth magnetic pickup is mounted to the encoder adapter. It is held in place by four screws. Remove the screws and the pickup can then be removed. The orientation of the pickup will depend on which model of measuring head that you have. Ensure that an o-ring is inserted between the plastic housing and the mount. An additional o-ring is used between the connector and the housing to keep moisture out.

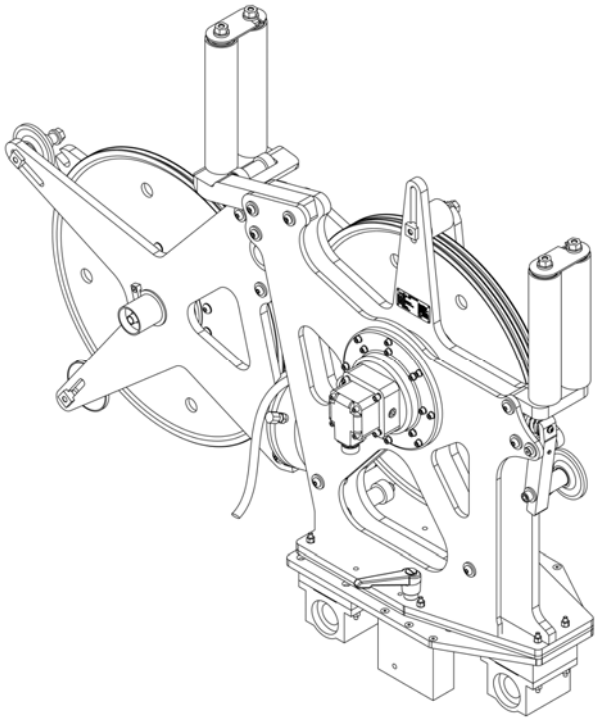
If the backup display is counting backward (i.e. counting negative when going down hole), simply rotate the pickup 180 degrees to change the direction.

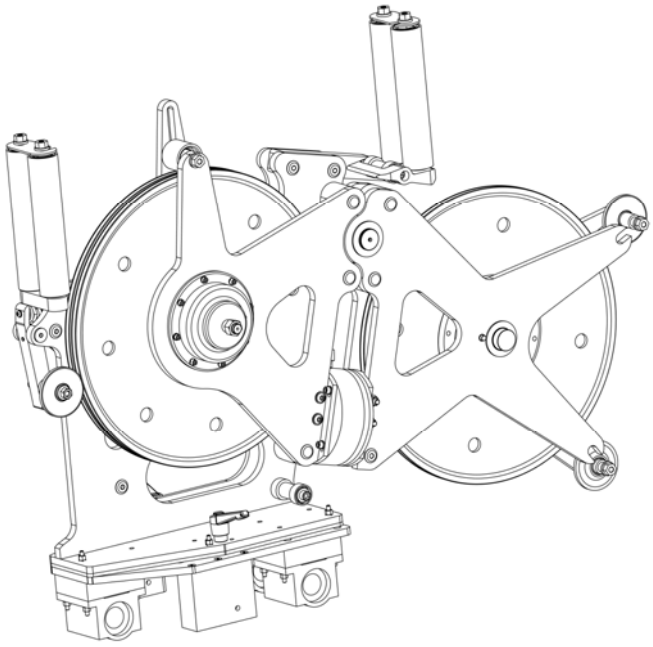




5.4.1 MEASURING HEAD 3D DRAWING

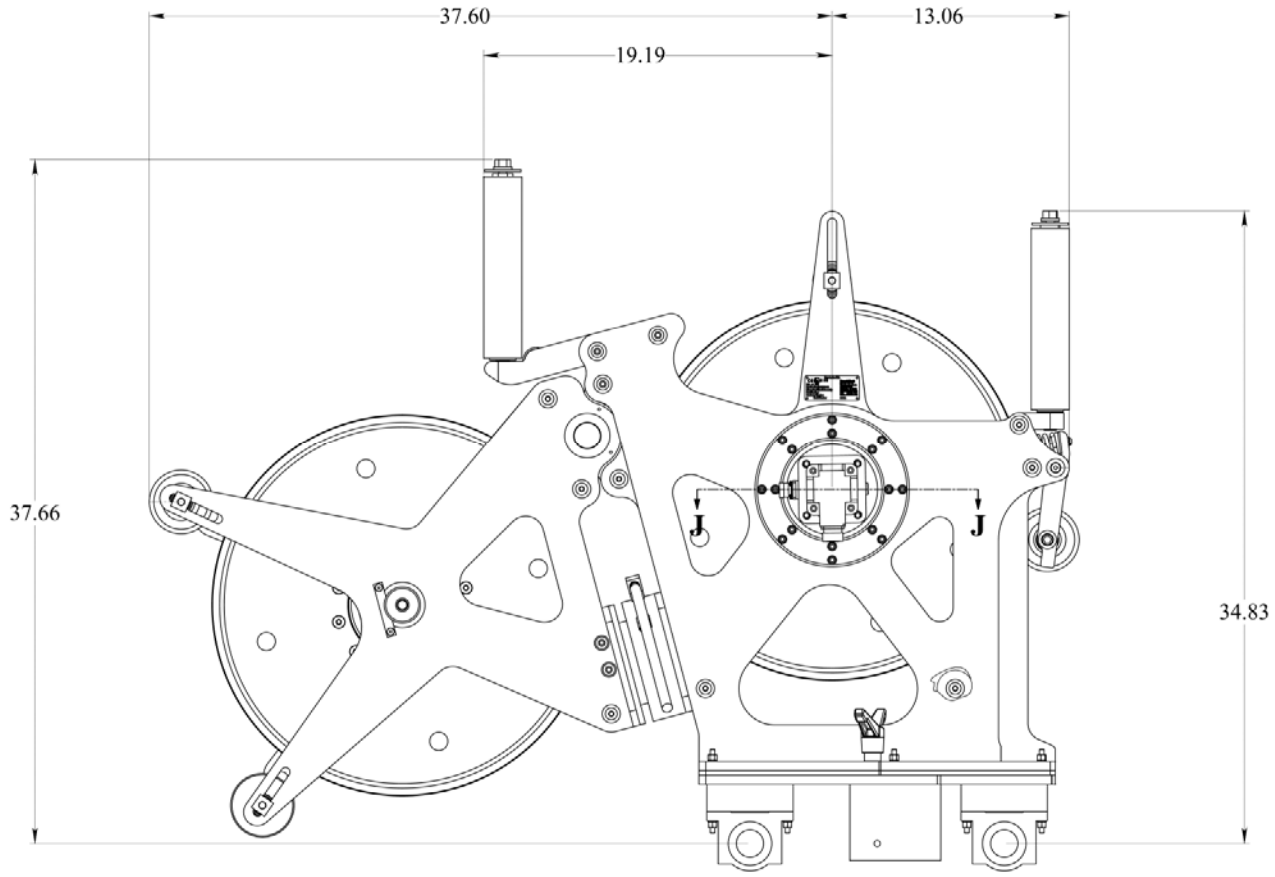
AMSLA595 THRESHER – 3D VIEWS





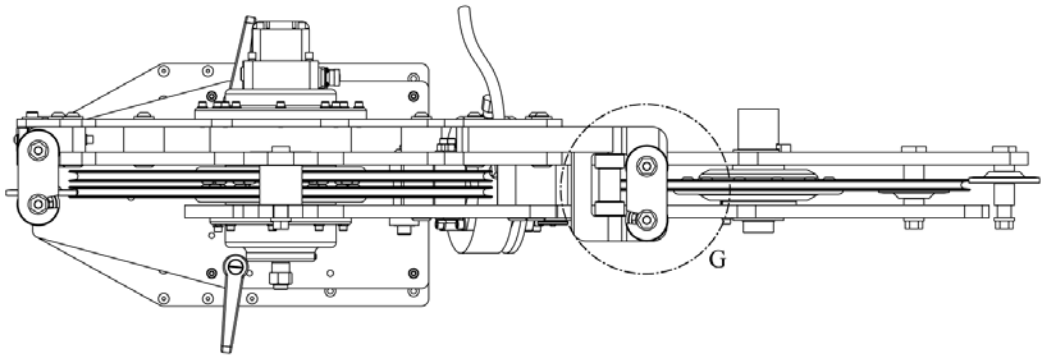
5.4.2 GENERAL ARRANGEMENT DRAWINGS - MEASURING HEAD

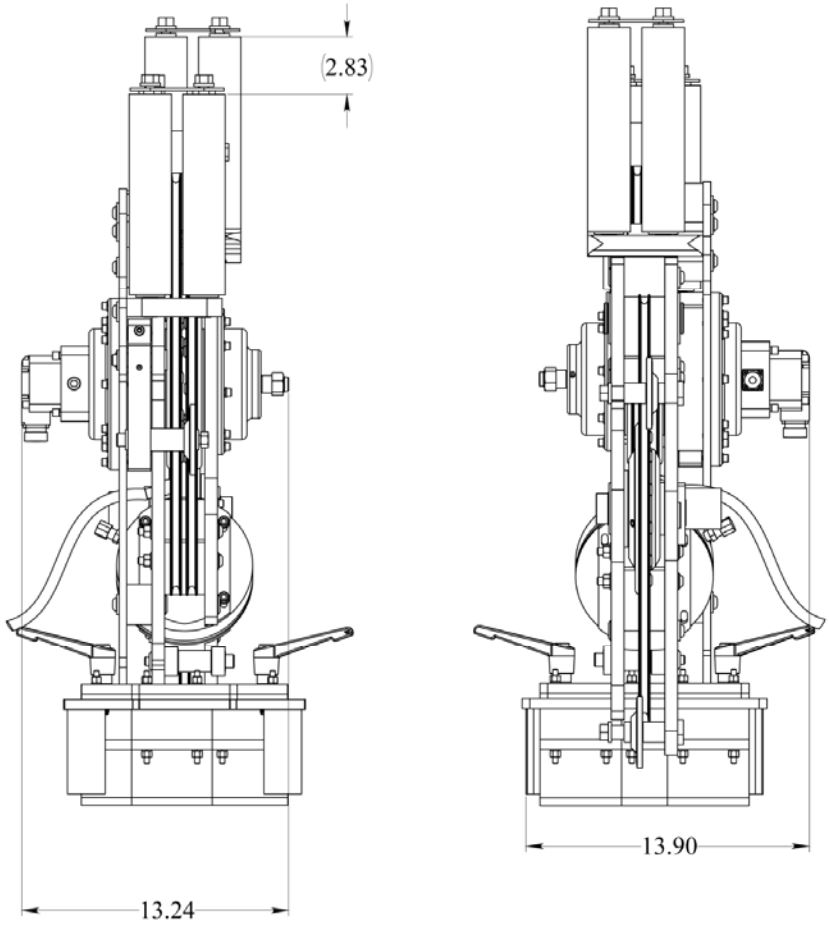
AMSLA595 THRESHER – ENCODER SIDE VIEW



5.4.2 GENERAL ARRANGEMENT DRAWINGS - MEASURING HEAD

AMSLA595 THRESHER - TOP & END VIEWS





5.4.3 ASSEMBLY DRAWING BILL OF MATERIALS - AMSLA THRESHER

LINE	PART	DESCRIPTION	QTY	REF
	AMSLA595	PARENT - COUNTER ASSY 2 WHL 20" 5/16 15,000# BASE MODEL THRESHER		
1	AMSLA559	WHEEL ASSY MEAS 5.33FT ORCA .092-5/16	0	
2	AMSLA562	WHEEL ASSY TENS 5.33FT ORCA .092-5/16	0	
3	AMSLA561	WHEEL ASSY IDLER 5.33FT ORCA .092-5/16	0	
4	AM3KM040	ADAPTER ENCODER H25D/H20 MAG BACKUP	0	OPTION
4	AM5KM057	ADAPTER ENCODER H37C/H25D	0	OPTION
5	AMSLM592	ADAPTER COUNTER HD RT ANGL DRV 5/16 ORCA 2 WHL COUNTER	1	
5	AMSLA574	KIT 2ND ENCDR MOUNT ORCA	0	OPTION
6	AMSLM578	MOUNT GUIDE ROLR FRONT ORCA HORIZ & VERT	1	
7	AMSLM639	PLATE BASE OPEN THRESHER	1	
8	AMSLM521	PLATE SPACER GUIDE ROLLER VERT LEVELWIND SLOTTED MAKO	2	
9	AMSLA529	SWIVEL ASSY TURNTABLE W/LINEAR BEARINGS MAKO	0	
9	AMSLA555	ASSY TROLLEY 1-1/2 HD ROLLER	0	
9	AMSLM044	BRACKET LEVELWIND CHAIN	2	
11	AMSLA437	ROLLER ASSY PRS 2.10OD 12MM SS	1	
11	AMSLM437	ROLLER KEEPER 2.10OD 12MM SST	0	REF
12	AMSLA162	WHEEL ASSY PRESS RLR 1/4 TENSN	3	
12	AMSLM162	ROLLER PRESSURE TENSION 1/4	0	REF
13	AMSLM569	ROLLER SLACK HORIZ LEVELWIND MAKO 12MM	2	
14	AMSLM228	NUT 7/16-14 TEE SLOT SST	3	
15	AMSLM449	GUIDE SPRING PRESS WHL 2WC	2	
16	AMSLM650	MOUNT GUIDE ROLR RR ORCA HYBRD	1	
17	AMSLM257	MOUNT PIVOT PRESS WHL ORCA 3/4 WRENCH	1	
18	AMSLM575	SHAFT MEAS WHL 50MM ENCDR/RT ANGLE DR 5/16 ORCA	1	
19	AMSLM585	PLATE ORIENTATION L PIN MAKO	1	
20	AMSLM153	SHAFT LOAD PIN REPL 1.5OD 2 WH	1	
20	AMSLP153	PIN LOAD 30K# 1-1/2OD 2.0mV/V 350 OHM 10-6P TYPE C W/SHUNT	0	OPTION
21	AM3KM050	COUPLING ENCDR W/BKUP MAGNETS	0	OPTION
22	AMSLM030	BUSHING FRAME 0.406 THRU HOLE 0.75 SHOULDER	7	
23	AMSLM531	BUSHING TENS WHL 1-1/2 LP MAKO	4	
24	AMSLM565	BUSHING L/P 1-1/2 W/ANTI-ROT 5/16 BRAIDED LINE MAKO	1	
25	AMSLM514	WASHER MEAS WHL SHAFT MAKO	1	
26	AMSLM529	BUSHING FRAME 3/8-16 ORCA 1.25 SHOULDER	9	

5.4.3 ASSEMBLY DRAWING BILL OF MATERIALS - AMSLA THRESHER cont'd

LINE	PART	DESCRIPTION	QTY	REF
27	AMSLM418	SHAFT GUIDE ROLLER VERT LVLWND ORCA	4	
28	AMSLM218	TBG SPACER GUIDE ROLLER LVLWND	4	
29	AMSLM219	ROLLER GUIDE VERT LEVELWIND	4	
30	AMSLM584	SCREW ANTI-ROTN TENS WHL MAKO	1	
31	AMSLM053	BUSHING FLANGE PRESS WHEL 3/8 ID X 3/4 OD SST	1	
32	AMSLM555	BUSHING FLANGE PRESS WHEL 5/16 -18 THD X 3/4 OD SST	1	
33	AMS1P072	PLUG 3/8 NPT SS	1	
34	AMSLM453	SPACER KEEPER ROLLER 0.70 THK 1-1/8 OD 7/16ID SST	2	
35	AMSLM040	SPACER FRAME 2 WHEEL COUNTER	3	
36	AMSLM580	SPACER PRESSURE WHEEL 1.07 THK	2	
37	AMSLM080	SPACER PRESSURE WHEEL 0.32 THK	2	
38	AMSLM283	SPACER KEEPER ROLLER 0.34 THK 0.69 OD SST	1	
39	AMSLM583	SPACER KEEPER ROLLER 0.61 THK 0.69 OD SST	3	
40	AMSLM541	SPACER PRESSURE WHEEL 1.65 THK ORCA	1	
41	AMSLM590	PIVOT HINGE ORCA	1	
43	AMSLM566	PLATE FRAME OPEN LWR 5/8 ORCA	1	
44	AMSLM567	PLATE FRAME MID LWR 5/8 ORCA	1	
45	AMSLM506	PLATE FRAME OPEN UPR 5/8 ORCA	1	
46	AMSLM607	PLATE FRAME MID UPR 5/8 MAKO H	1	
47	AMSLM608	PLATE FRM OUTR UPR 3/8 MAKO HY	1	
48	AMSLM596	ADAPTER MEAS WHL SHAFT 50MM ENCODER SIDE ORCA	1	
49	AM5KA055	ASSY ENCODER BACKUP MAGNETIC	0	OPTION
49	AM5KP046	PLUG FREEZE 3/4 DIA BRASS	0	OPTION
50	AMSLP061	ENCODER S25HA-37F-1200-ABZC-69-S18-15-SPECIAL ETI HARD ANODIZED HOUSING	0	OPTION
51	AM5KM073	COUPLING MOD ENCDR 0.250/0.375	0	OPTION
51	AMS1P090	COUPLING OLDHAM ENCODER *C123 10/26/++15	0	OPTION
52	AMSLP213	BEARING SPHERE-ROL 65MM ID MCGILL W/SEALS	1	
53	AMSLP031	BEARING BALL 50MM 2-ROW 50MM ID X 110MM OD X 44.4MM W	2	
54	AM3KP204	BEARING BALL 20MM SST ABEC-1 REPLACES C276P002	8	
55	AMSLP005	BEARING PILLOW BLOCK 1-1/2 COMPENSATED	2	
56	AMSLP009	BEARING BRZ FLANGED 3/8" ID X 1/4L OIL IMPREGNATED	2	

5.4.3 ASSEMBLY DRAWING BILL OF MATERIALS - AMSLA THRESHER cont'd

LINE	PART	DESCRIPTION	QTY	REF
57	AMSLP112	BEARING BALL 12MM SST	8	
58	AMSLP231	BEARING BALL 2-5/16 BORE X 3-1/16 OD X 7/16 W	1	
59	AMSLP501	BEARING BRZ 1.50ID X 2.00OD X 2.00 LG SAE 660	1	
60	AMSLP115	INDICTR WT M/D TOTCO 15K# 20FT HOSE 6" GAUGE 12SI WT IND	0	OPTION
60	AMSLP204	INDICTR WT M/D TOTCO 4K# 20FT HOSE 6" GAUGE 12SI WT IND	0	
61	AMSLM502-1	MOUNT HYD L/C UPR ORCA	1	
62	AMSLM502-2	MOUNT HYD L/C LWR ORCA	1	
63	AMSLM504	WHEEL MEASURING 5.33 FT ORCA BOLT ON 0.092-5/16	3	
64	AMSLM509	HUB TENSION WHL 5.33 FT ORCA BOLT-ON 65MM	1	
65	AMSLM511	HUB MSRNG WHL 5.33 FT ORCA BOLT-ON 50MM	1	
66	AMSLM512	HUB IDLER WHL 5.33 FT ORCA BOLT-ON 3-1/16 BRG	1	
67	AMSLM513	BUSHING IDLER WHL 50MM SST ORC	1	
74	AMSLM523	PIN HINGE 1-1/2 ORCA SST	1	
75	AMSLM518	TBG SPACER SLACK ROLLER LVLWND	2	
77	AMSLM530	BUSHING FRAME 3/8-16 MAKO 3.62 SHOULDER	2	
78	AMSLM540	SPACER FRAME 2" MAKO	2	
81	AMSLM579	BUSHING FRAME 0.406 THRU HOLE 1.25 SHOULDER	4	
99	AM5KP129	FITTING GREASE FLUSH STRAIGHT STL	3	
101	AMSLA630	WEATHER SEAL ASSEMBLY	1	
102	AM5KM621	LABEL MEASURING HEAD 1.38 X 3.00 SST	1	
103	C276P190	SCREW 2 X 3/16 U-DRIVE SST DRILL #44	4	
110	100013033	BEARING PILLOW BLK LINEAR 1.50 ID OIL IMPREGNATED BRONZE	1	
111	AM5KP130	NOZZLE GREASE FITTNG FLUSH	1	NOT SHOWN
133	AMSLP244	SCREW 7/16-14 X 4 SOC HD CAP SST	2	
134	C276P031	SCREW 1/4-20 X 1-1/4 SOC HD SS	2	
137	AMSLP068	SCREW 3/8-16 X 4 BUT HD SS	4	
138	AMS1P047	WASHER 5/16 LOCK SS	3	
140	AMSLP438	WASHER 3/8 LOCK INT STAR SST 0.7 OD X .03 THK	36	
141	AM5KP011	WASHER M20 FLAT SST 37MM OD 3MM THK	4	
147	AMSLP412	RING RETNG INT 1.250 SHAFT SST KEEPER WHEEL	0	KEEPER WHEEL
148	AMSLP522	RING RETNG INT 4.750 LT DUTY .046 THICK SST	2	TENSION WHEEL

5.4.3 ASSEMBLY DRAWING BILL OF MATERIALS - AMSLA THRESHER cont'd

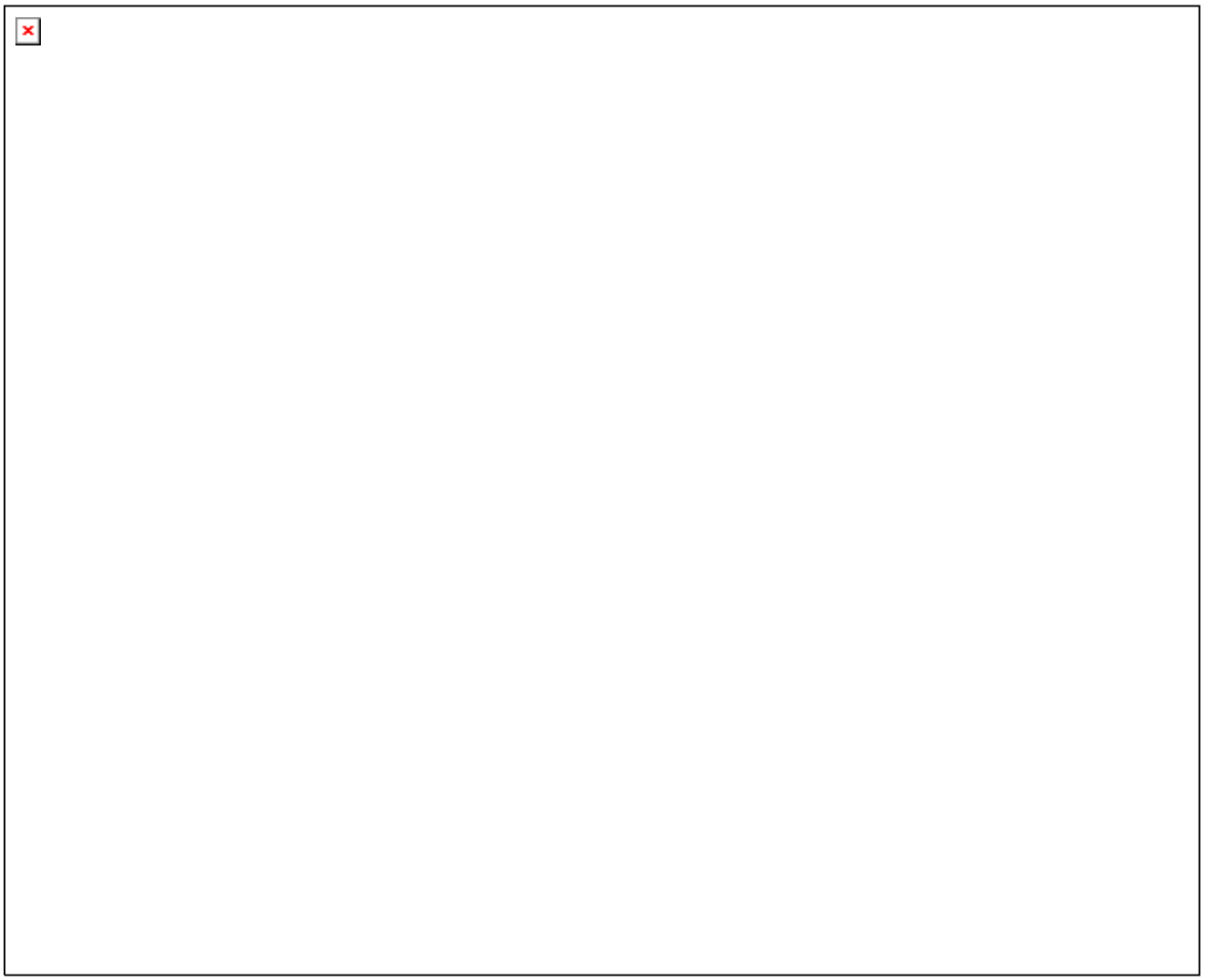
LINE	PART	DESCRIPTION	QTY	REF
154	AMSLP306	RING RETNG INT 3.062 LT DUTY .039 THICK SST	2	SPOOLER BRG
157	AMSLP105	RING RETNG EXT 1.500 SHAFT SST LOAD PIN, HINGE PIN	5	LOAD PIN, HINGE PIN
158	AMSLP568	RING RETNG INT 4.375 LT DUTY .046 THICK SST	2	MWHL BRGS
159	AMSLP278	SPRING COMP 2.00 OAL 1.218 OD GROUND ENDS SST 1.218 DIA X 0.207 WIRE	1	
160	AMSLP015	KEY 1/4 X 7/8 WOODRUFF SST 807	1	
162	C276P014	INSERT 1/4-20 HELI-COIL #R1185-4-375	25	
163	C276P046	WASHER #6 LOCK SS	4	
164	C276P035	WASHER #10 LOCK SS	4	
165	AMS1P058	WASHER 3/8 LOCK SS	11	
166	C276P513	WASHER 3/8 FLAT SST	8	
167	C276P036	WASHER 1/4 LOCK SS	5	
168	AM5KP144	WASHER 1/4 LOCK SS HIGH COLLAR 0.363 OD X .093 THK	27	
169	AMSLP047	WASHER 7/16 LOCK SST	2	
170	AMSLP247	WASHER 7/16 HEAVY FLAT SST 1/8 THICK X 1"OD	5	
171	AMS1P014	O-RING 2-152 BUNA N ENC ADPTR 3-1/4 X 3-7/16 X 3/32	1	ENCODER ADAPTER
172	AM5KP071	O-RING 2-141 BUNA N H25 ENCDR 2 5/16 x 2 1/2 x 3/32	1	ENCODER
173	C276P042	O-RING 2-016 BUNA N 5/8 X 3/4 X 1/16	0	BACKUP CONNECTOR
174	C276P041	O-RING 2-017 BUNA N 11/16 X 13/16 X 1/16	0	BACKUP HOUSING
176	AMS8P024	NUT 3/8-16 ELASTIC STOP SST	4	
177	AMSLP059	NUT 7/16-14 SST	1	
178	C276P021	NUT 7/8-14 ELASTIC STOP SST 1-1/4 HEX 63/64 HIGH	1	
179	AMSLM207-350	SCREW 7/16-14 X 3.50 FLGHD SST	3	
180	AMSLP056	SCREW 7/16-14 X 2-3/4 SOC HD CAP SST	1	
181	AMSLM207-075	SCREW 7/16-14 X 3/4 FLG HD SST	4	

5.4.3 ASSEMBLY DRAWING BILL OF MATERIALS - AMSLA THRESHER cont'd

LINE	PART	DESCRIPTION	QTY	REF
182	AMSLP072	SCREW 3/8-16 X 2 BUT HD SS	5	
183	AMSLP071	SCREW 3/8-16 X 2-1/2 BUT HD SS	2	
184	AMSLP241	SCREW 5/16-18 X 1 LOW HD SST HEX SOCKET	3	
185	AMSLP142	SCREW 3/8-16 X 3 BUT HD SS	4	
186	AMSLP362	SCREW 3/8-16 X 5/8 BUTTON HD 18-8 SST	36	
188	AM3KP027	SCREW 1/4-20 X 1-1/2 SOC HD SS	5	
189	AMSLP025	SCREW 1/4-20 X 1 SOC HD SST	16	
190	AMS5P016	SCREW 1/4-20 X 2-3/4 SOC HD SS	8	
191	ACMU2P31	WASHER 1/4 FLAT 5/8OD SST	1	
193	AMS4P870	SCREW 1/4-20 X 3/4 BTN HD SST	1	
194	AMS1P053	SCREW 10-24 X 2 SHCS SST	4	
195	AM5KP045	SCREW 10-24 X 1/2 FH SOC SST	2	
197	C276P331	SCREW 6-32 X 1/2 PHIL PAN SST	4	
198	AMSLP023	BOLT SHOULDER 3/8 X 1-3/4 SST 5/16-18 THD	1	

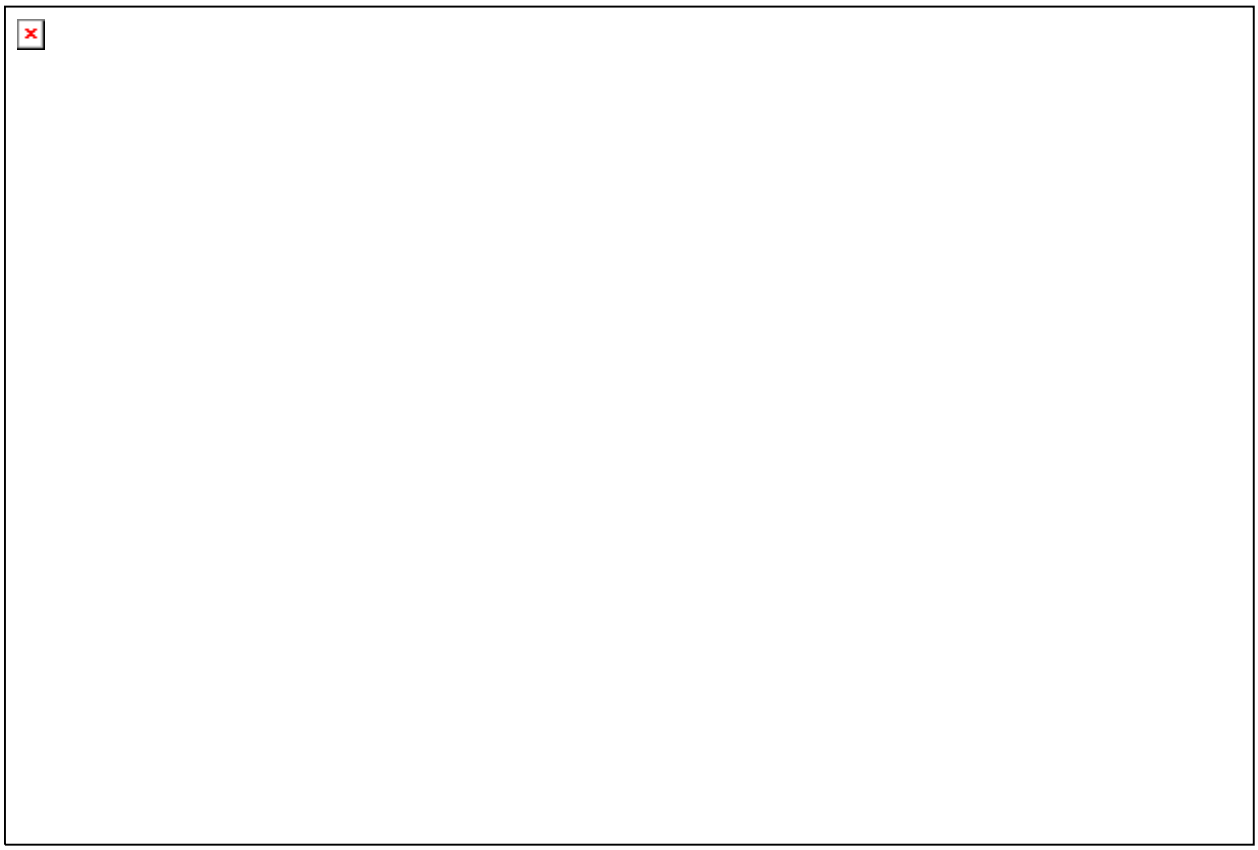
5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD

AMSLA595 THRESHER – ENCODER SIDE VIEW



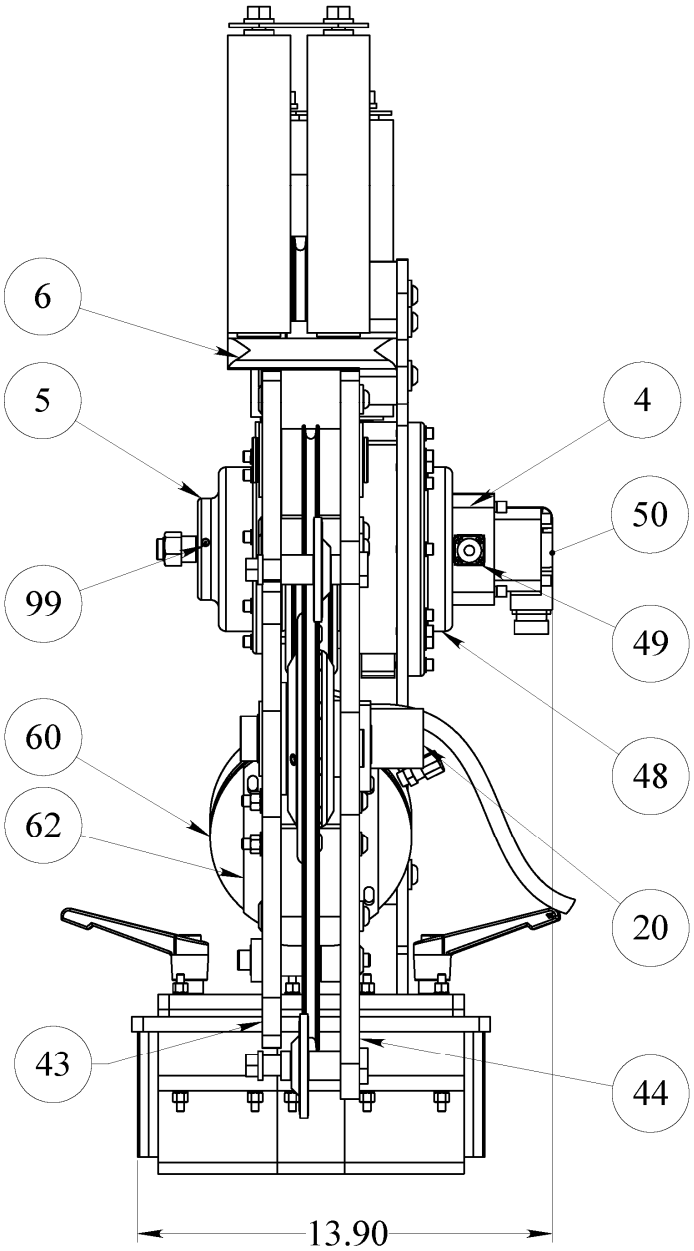
5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA595 THRESHER – BACK SIDE VIEW



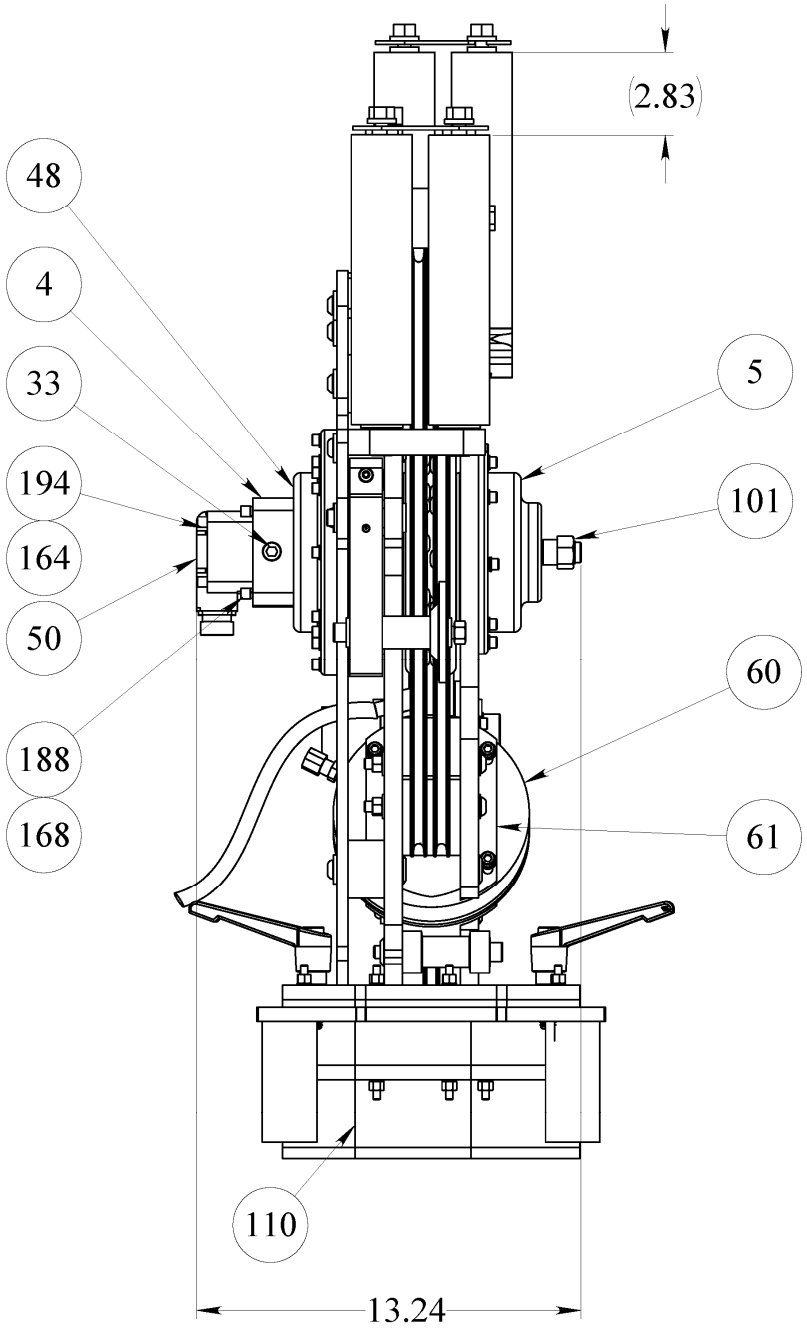
5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA595 THRESHER – WELL SIDE VIEW



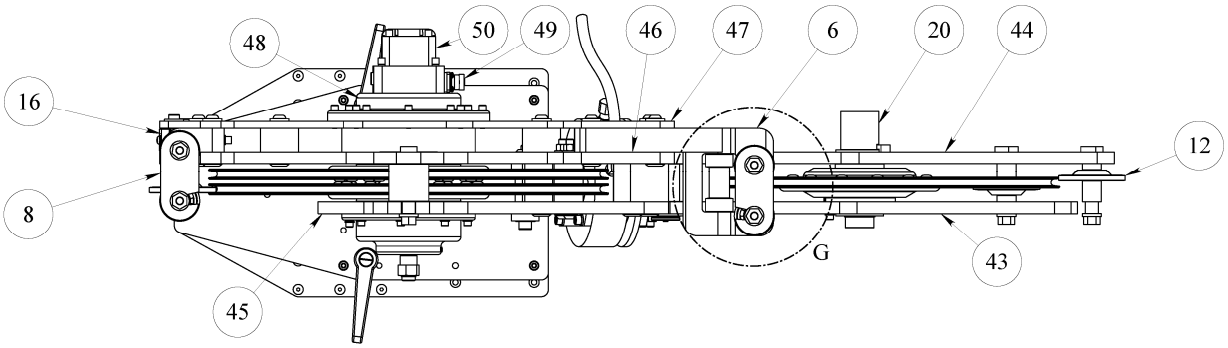
5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA595 THRESHER – DRUM SIDE VIEW

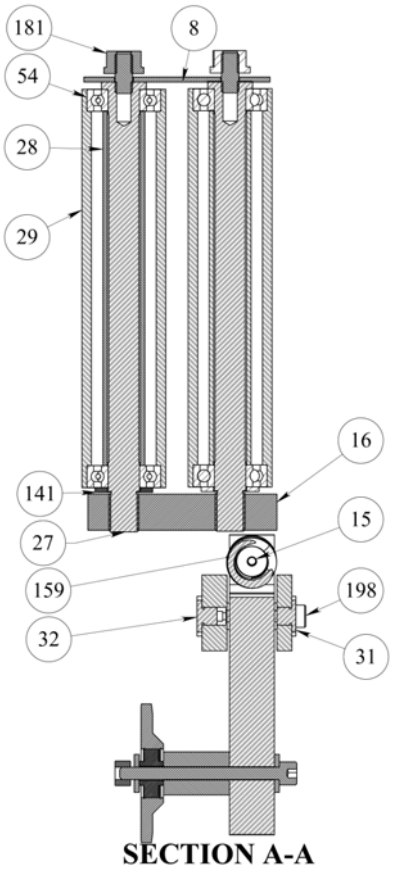


5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA595 THRESHER – TOP-DOWN VIEW

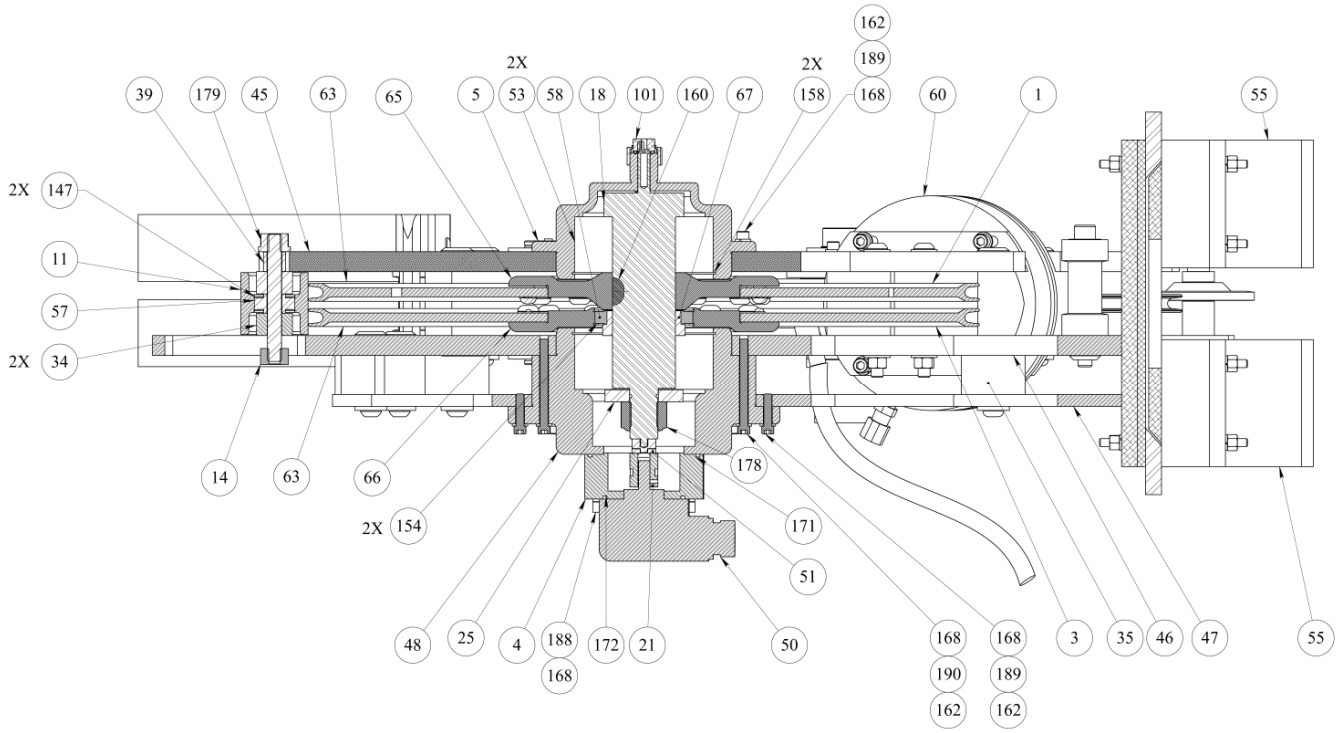


AMSLA595 THRESHER – GUIDE ROLLER



5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

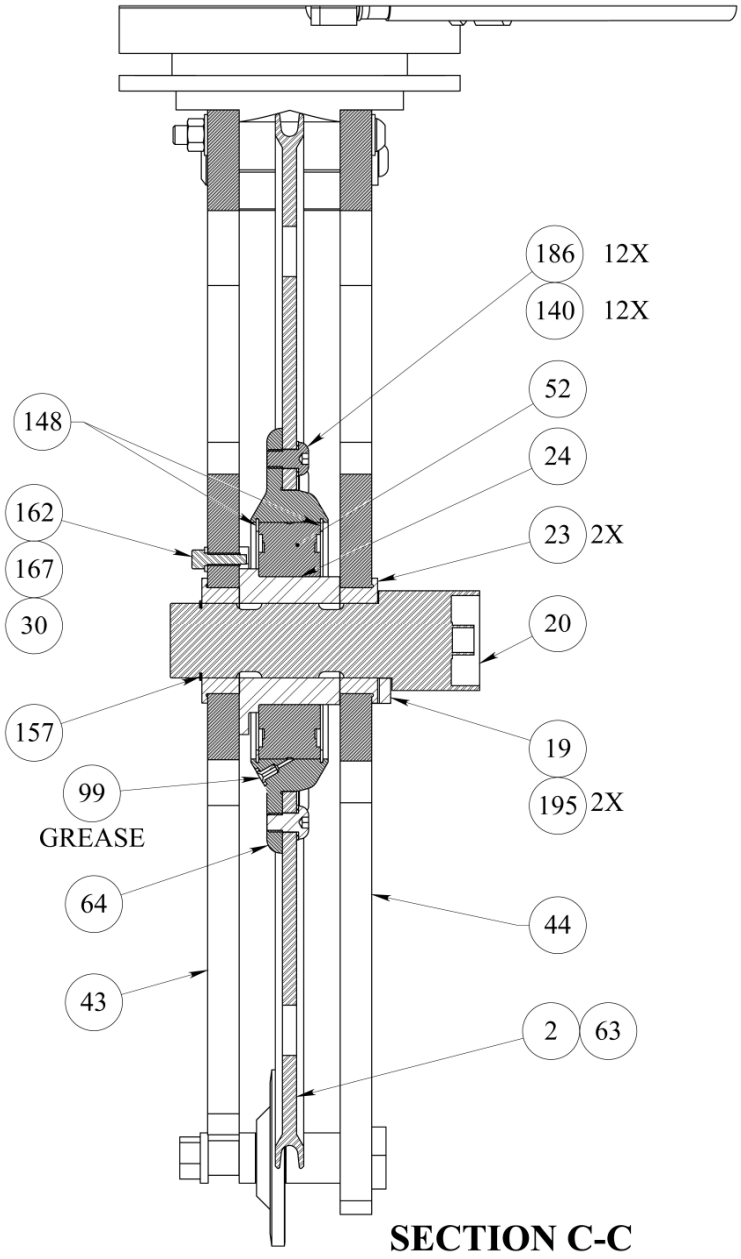
AMSLA595 THRESHER – MEASURING WHEEL



SECTION B-B

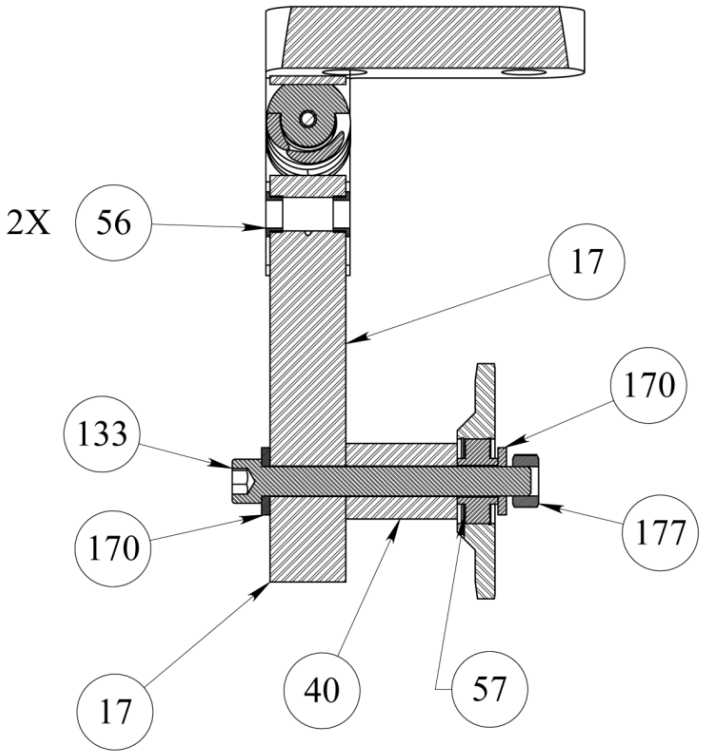
5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA595 THRESHER – TENSION WHEEL

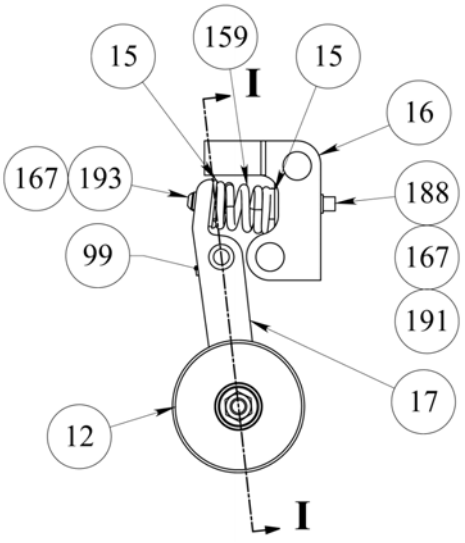


5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA595 THRESHER – PRESSURE WHEEL

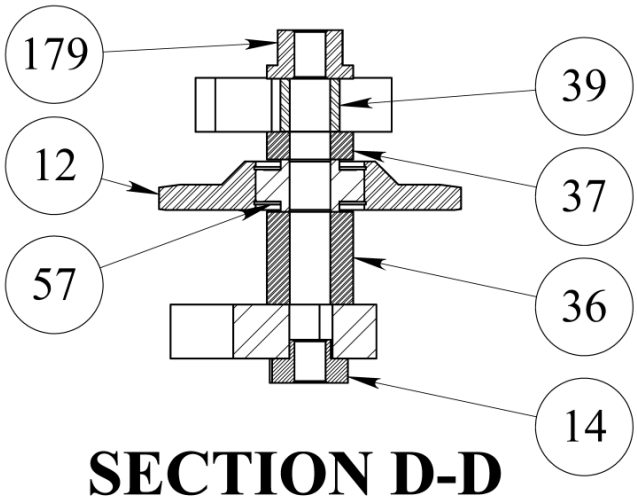


SECTION I-I

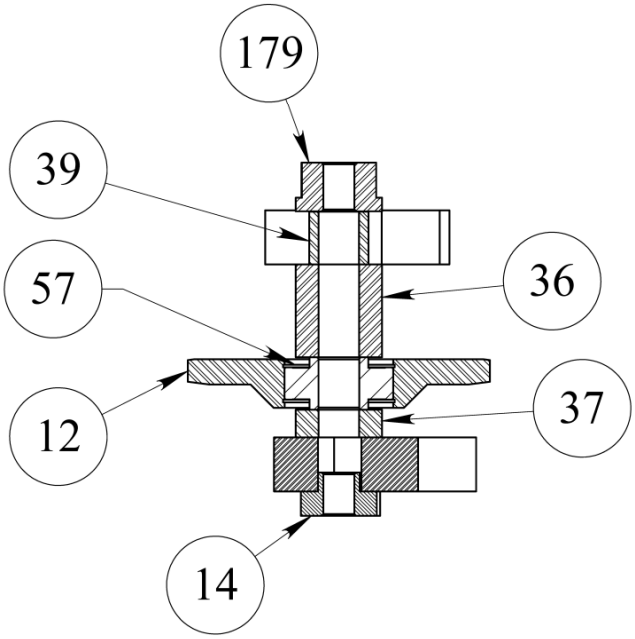


5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA595 THRESHER – PRESSURE WHEEL



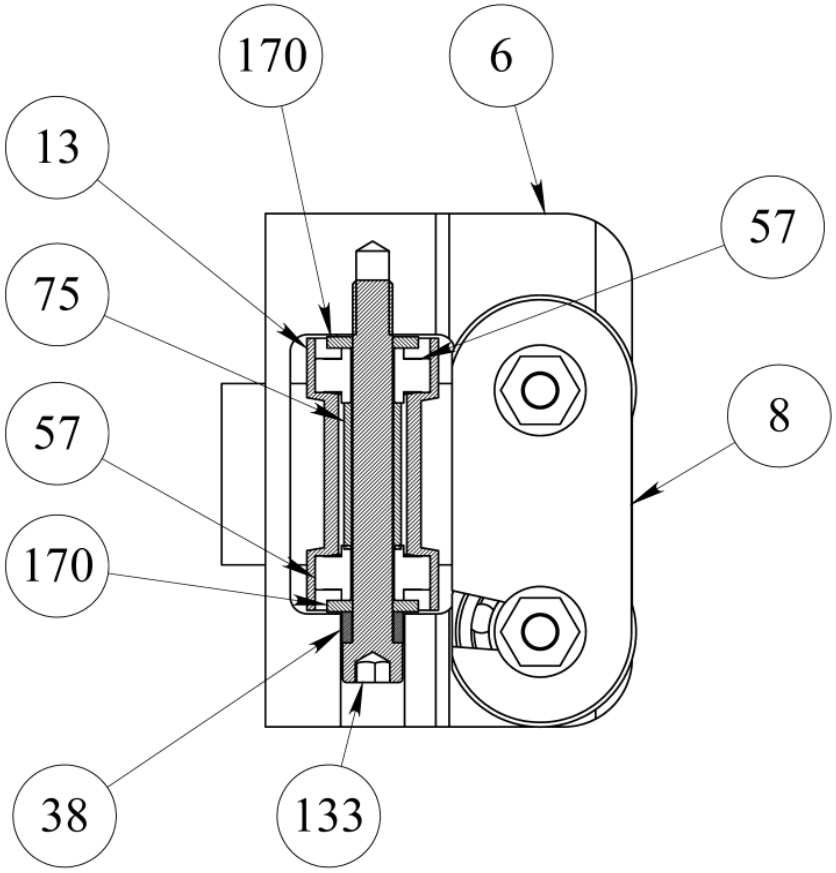
SECTION D-D



SECTION E-E

5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA595 THRESHER – GUIDE ROLLER – TOP VIEW



DETAIL G

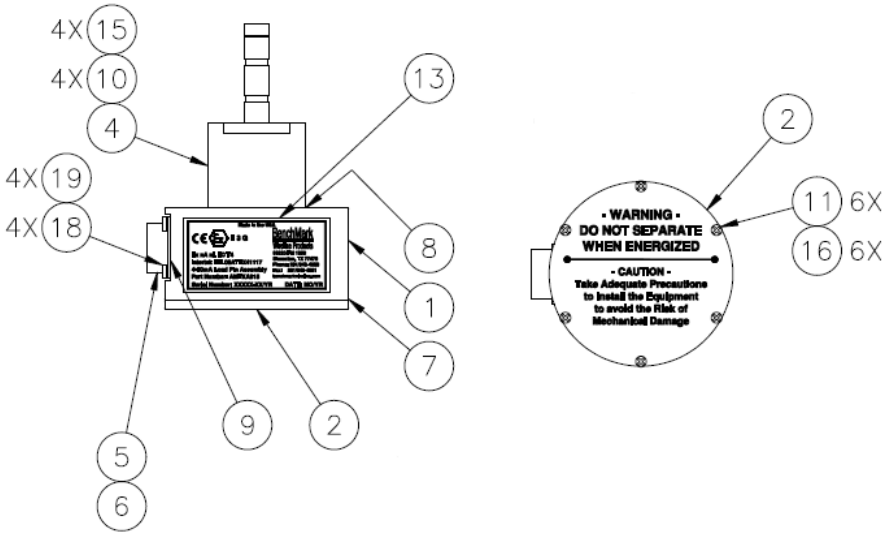
BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton,Texas 77476
Phone: 281.346.4300
Fax: 281.346.4301
benchmarkwireline.com

Recommended Spare Parts List - AMSLA THRESHER

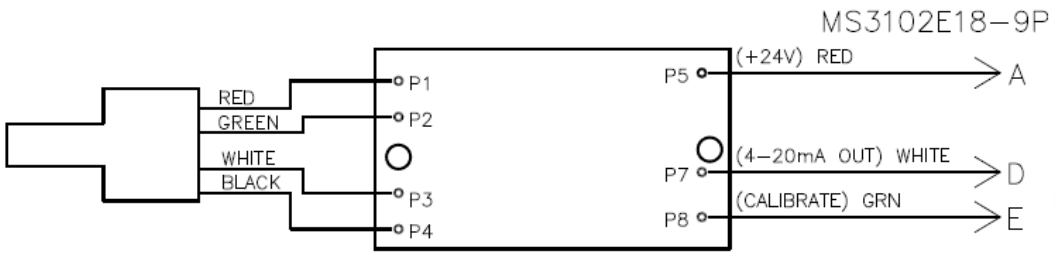
This is a list of recommend spare parts. Normally you would stock the suggested QTY of spares. For REMOTE areas where resupply is difficult, use the REMOTE amounts.

ITEM	P/N	DESCRIPTION	QTY	REMOTE
1		WHEEL MEASURING 4FT 0.092-1/4	0	1
2	AMSLA560	WHEEL ASSY TENS 20" 5/16 MAKO	0	1
4	AM3KM040	ADAPTER ENCODER H25D/H20 MAG	0	1
12	AMSLA162	WHEEL ASSY PRESS RLR 1/4 TENSN	2	2
13	AMSLA163	WHEEL ASSY PRESS RLR 1/4 MEASR	1	2
NOTE - ONLY STOCK THE LOAD AXLE USED IN YOUR MEASURING HEAD				
20	AMSLA215A	ASSY LOAD AXLE 4-20mA 1.50 DIA 15K# LINE PULL 2WIR Exn	0	1
20	AMSLA252A	ASSY LOAD AXLE 2MV/V 1-1/2 Z2 P10-6P DUAL PASSIV 09ATEX41118	0	1
20	AMSLA253A	ASSY LOAD AXLE 2MV/V 1-1/2 Z2 P10-6P PASSIVE 09ATEX41118	0	1
20	AMSLA272A	ASSY LOAD AXLE 2MV/V 1-1/2 Z2 KP16-8P PASSIVE 09ATEX41118	0	1
20	AMSLA277A	ASSY LOAD AXLE 2MV/V 1-1/2 Z2 MS14S 6P PASSIVE 09ATEX41118	0	1
20	AMSLA278A	ASSY LOAD AXLE 2MV/V 1-1/2 Z2 CWL18 10P PASSIVE 09ATEX41118	0	1
20	AMSLA287A	ASSY LOAD AXLE 2MV/V 1-1/2 Z2 CWL18 10P PASSIVE 09ATEX41118	0	1
20	AMSLA550B	ASSY LOAD AXLE 0-1.5V 1-1/2DIA 0-15000# KPT16 8 PIN Exn	0	1
21	AM3KM050	COUPLING ENCDR W/BKUP MAGNETS	0	2
NOTE - ONLY STOCK THE ENCODER USED IN YOUR MEASURING HEAD				
49	AM5KA055	ASSY ENCODER BACKUP MAGNETIC	0	1
49	AM5KA058	ASSY ENCDR BACKUP MAG EEx nA	0	1
50	AM5KA068B	ASSY ENCDR 1200 PPR OPTICAL MS16 HES Ex nA ETL09ATEX41123	0	1
50	AM5KA070B	ASSY ENCDR 512/780 PPR OPTICAL KP14 Ex nA ETL09ATEX41123	0	1
50	AM5KA074B	ASSY ENCDR 1200 PPR OPTICAL MS18 Ex nA ETL09ATEX41123	0	1
50	AM5KA079B	ASSY ENCDR 1200 PPR OPTICAL MS16 STD Ex nA ETL09ATEX41123	0	1
50	AM5KA080B	ASSY ENCDR 1200 PPR OPTICAL MS16 BLUE Ex nA ETL09ATEX41123	0	1
51	AMS1P090	COUPLING OLDHAM ENCODER	1	2
52	AMSLP040	BEARING SPHERE-ROL 50MM ID	1	2
53	AMSLP030	BEARING BALL 30MM 2-ROW SST	1	2
54	AM3KP204	BEARING BALL 20MM SST ABEC-1	2	2

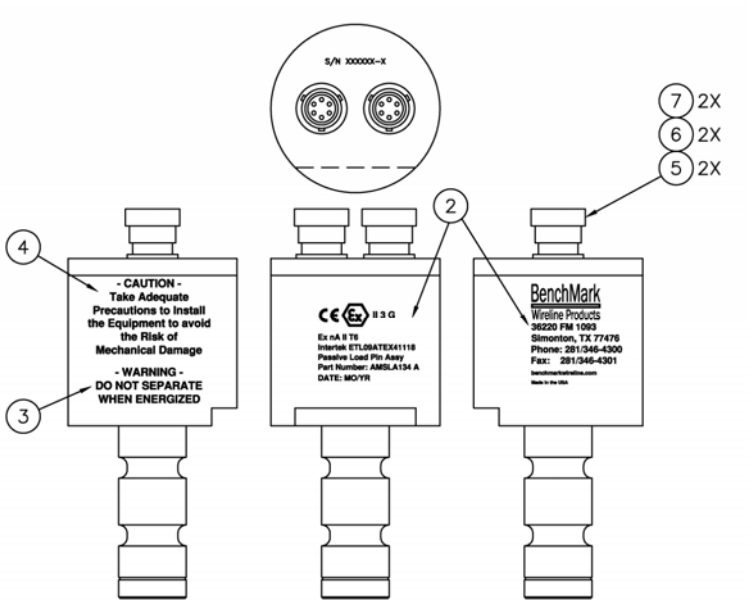
5.5.1 LOAD PIN – LOAD PIN - 4-20MA CURRENT LOOP - AMSLA215A



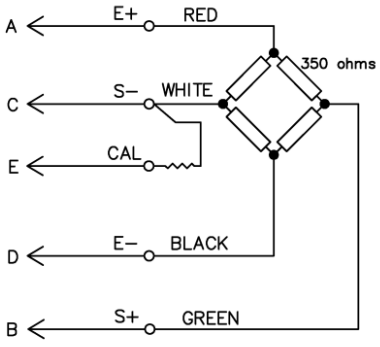
ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AMSLP151	PIN LOAD 30K# 1-1/2OD 2.0mV/V 350 OHM 10VDC EXC HEADER	1	EA
5	AMS7P013	CONN MS3102E-18-9P LOAD CELL 7 PIN	1	EA
6	ACMU2P09	DUST CAP MS25043-18DA RECEPT	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
9	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	AMS8P034	SCREW 4-40 X 3/8 SOC HD SST	6	EA
13	AM5KM647	LABEL LOAD PIN Ex nA 4-20mA 09ATEX41117	1	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	6	EA
18	AMS1P040	SCREW 6-32 X 3/8 PHIL PAN SST	4	EA
19	C276P046	WASHER #6 LOCK SS	4	EA

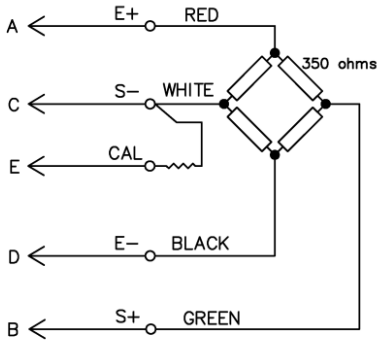


5.5.2 LOAD PIN – DUAL PASSIVE – AMSLA252A

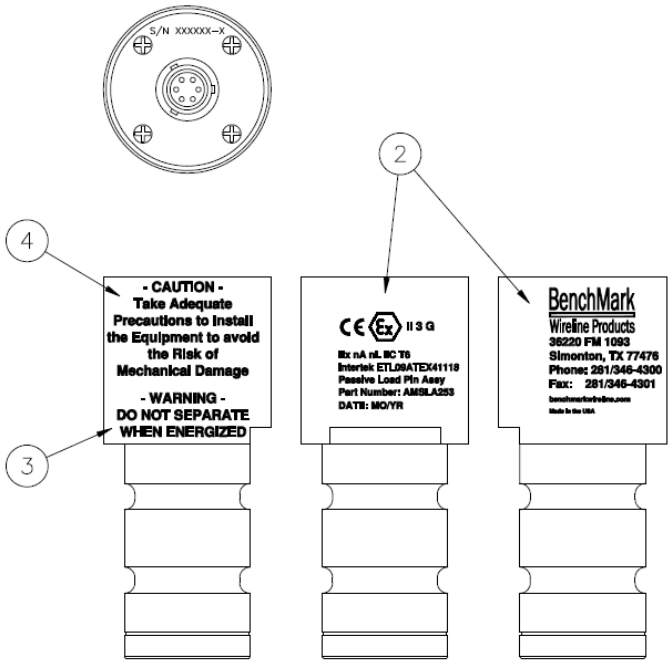


ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMSLP152	PIN LOAD 30K# 1-1/2OD 2.0mV/V 350 OHM DUAL TYPE C W/SHUNT	1	EA
2	AM5KM648	LABEL LOAD PIN Ex nA PASSIVE 09ATEX41118	1	EA
3	AM5KM650	LABEL WARNING LOAD PIN ENCDR DO NOT SEPARATE WHEN ENERGIZED	1	EA
4	AM5KM645	LABEL LOAD PIN CAUTION AVOID MECHANICAL DAMAGE	1	EA
5	AM5KP059	DUST CAP KPT8010C CANNON MS3180-10CA	2	EA
6	ALS4P007	SCREW 4-40 X 3/4 PHIL PAN SST	2	EA
7	AMS8P036	WASHER #4 LOCK SST	2	EA

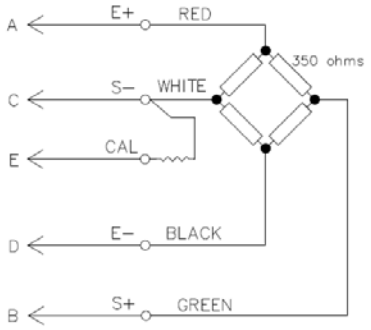




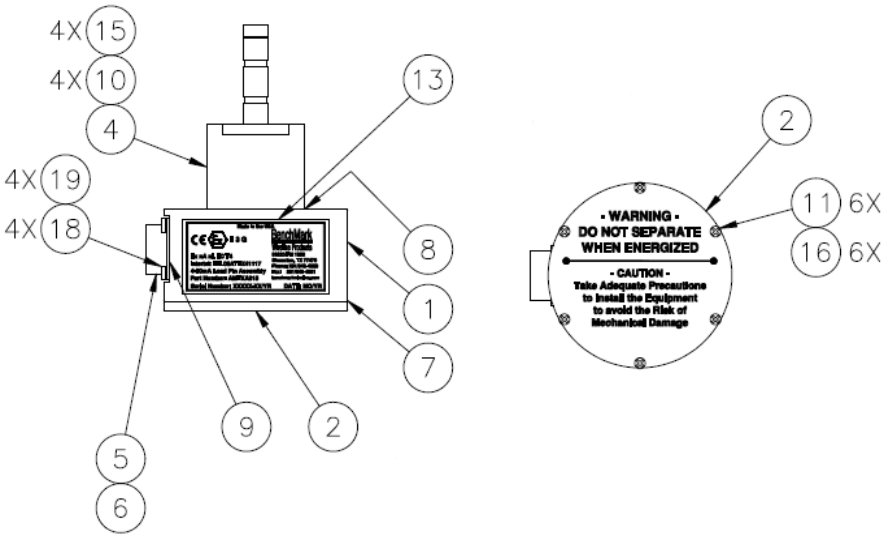
5.5.3 LOAD PIN - PASSIVE - AMSLA253A



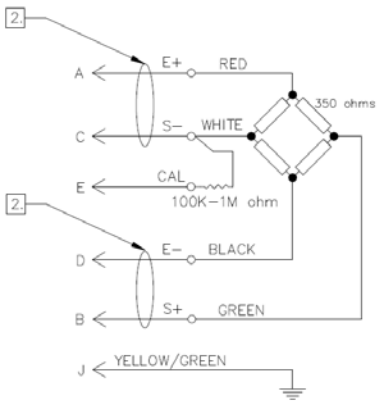
ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMSLP153	PIN LOAD 30K# 1-1/2OD 2.0mV/V 350 OHM 10-6P TYPE C W/SHUNT	1	EA
2	AM5KM648	LABEL LOAD PIN Ex nA PASSIVE 09ATEX41118	1	EA
3	AM5KM650	LABEL WARNING LOAD PIN ENCDR DO NOT SEPARATE WHEN ENERGIZED	1	EA
4	AM5KM645	LABEL LOAD PIN CAUTION AVOID MECHANICAL DAMAGE	1	EA



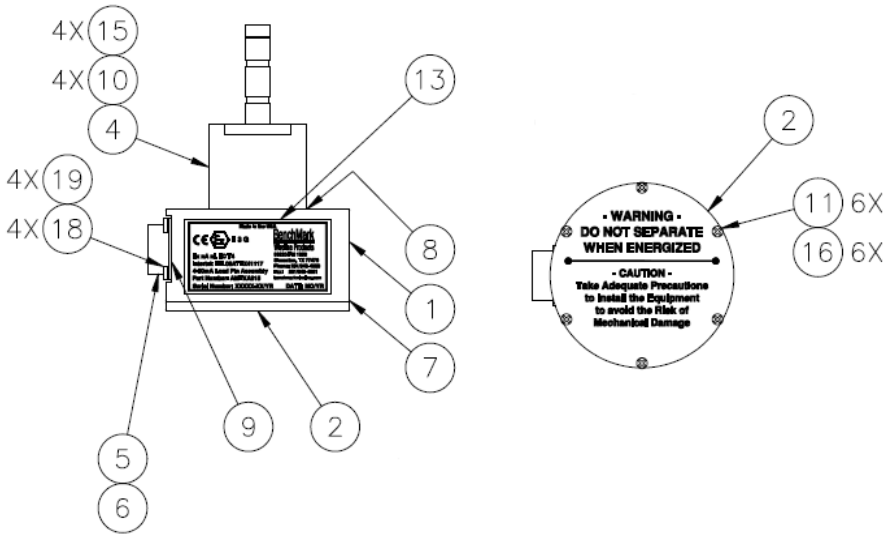
5.5.4 LOAD PIN – PASSIVE – AMSLA272A



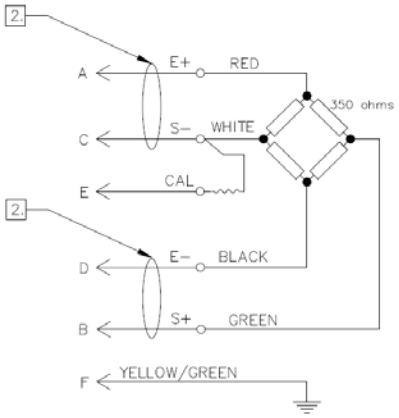
ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AMSLP151	PIN LOAD 30K# 1-1/2OD 2.0mV/V 350 OHM 10VDC EXC HEADER	1	EA
5	AMS8P055	CONN KPT02A16-8P	1	EA
6	AMS8P056	DUST CAP KPT8116C RECEPT	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
9	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	AMS8P034	SCREW 4-40 X 3/8 SOC HD SST	6	EA
12	AM5KP228	STANDOFF 4-40 X 1/2 M/F HEX	2	EA
13	AM5KM648	LABEL LOAD PIN Ex nA PASSIVE 09ATEX41118	1	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	6	EA
17	AMS8P090	WASHER #4 FLAT SST	6	EA



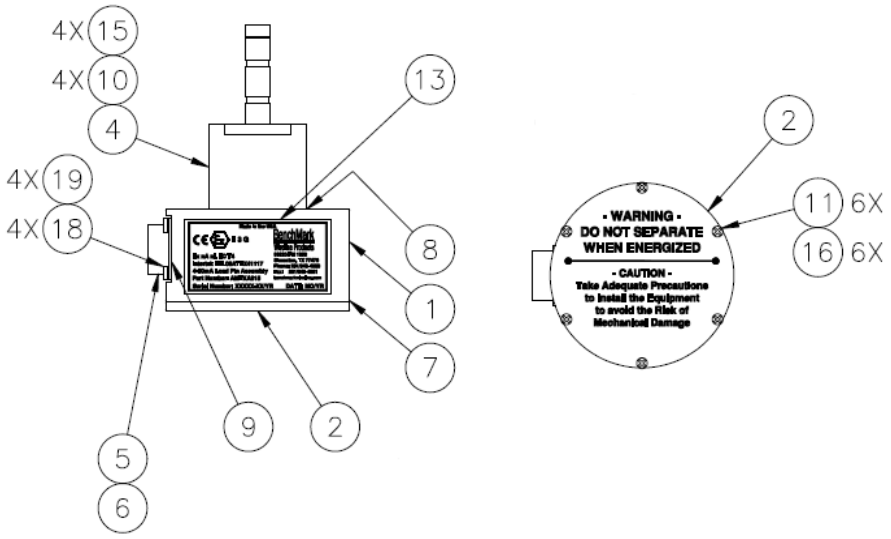
5.5.5 LOAD PIN - PASSIVE - AMSLA277A



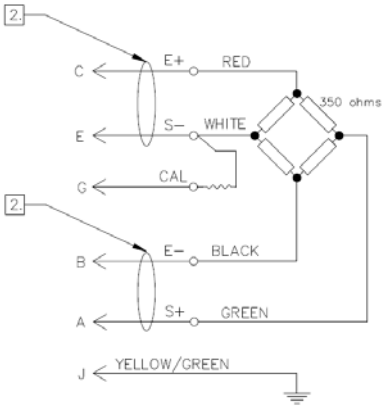
ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AMSLP151	PIN LOAD 30K# 1-1/2OD 2.0mV/V 350 OHM 10VDC EXC HEADER	1	EA
5	C276P043	CONN MS3102E-14S-6P LOAD AXLE	1	EA
6	AMS7P041	DUST CAP MS25043-14DA RECEPT POWER IN	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
9	AM5KP219	O-RING 2-019 BUNA N 70D	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	C276P047	SCREW 4-40 X 1/2 PHIL PAN SST	6	EA
13	AM5KM648	LABEL LOAD PIN Ex nA PASSIVE 09ATEX41118	1	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	10	EA
18	C276P143	SCREW 4-40 X 3/8 PHIL PAN SST	4	EA



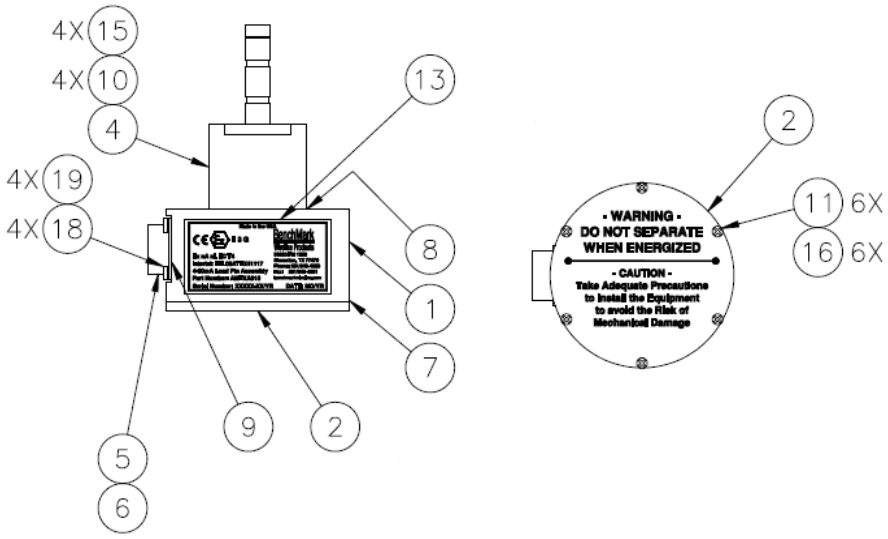
5.5.6 LOAD PIN – PASSIVE – AMSLA278A



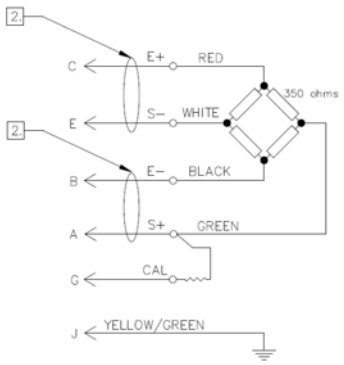
ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AMSLP151	PIN LOAD 30K# 1-1/2OD 2.0mV/V 350 OHM 10VDC EXC HEADER	1	EA
5	AM5KP068	CONN 10-107218-1P BENDIX QWL COURSE THREAD 10 PIN	1	EA
6	AM5KP067	DUST CAP KPT8116C RECEPT	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
9	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	C276P047	SCREW 4-40 X 1/2 PHIL PAN SST	6	EA
13	AM5KM648	LABEL LOAD PIN Ex nA PASSIVE 09ATEX41118	1	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	6	EA
18	AM5KP184	SCREW 8-32 X 3/8 PHIL PAN SST	4	EA
19	AMS1P056	WASHER #8 LOCK SST	4	EA



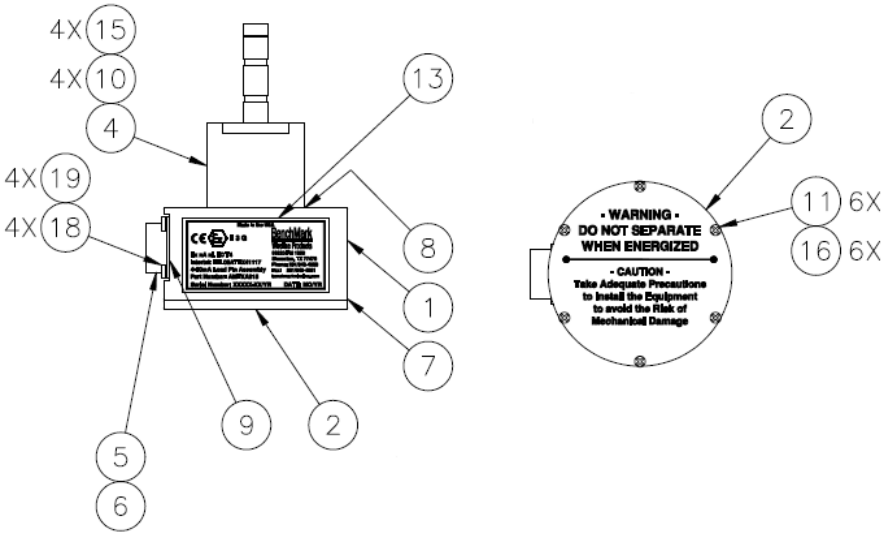
5.5.7 LOAD PIN - PASSIVE - AMSLA287A



ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AMSLP151	PIN LOAD 30K# 1-1/2OD 2.0mV/V 350 OHM 10VDC EXC HEADER	1	EA
5	AM5KP068	CONN 10-107218-1P BENDIX QWL COURSE THREAD 10 PIN	1	EA
6	AM5KP067	DUST CAP KPT8116C RECEPT	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
9	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	C276P047	SCREW 4-40 X 1/2 PHIL PAN SST	6	EA
13	AM5KM648	LABEL LOAD PIN Ex nA PASSIVE 09ATEX41118	1	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	6	EA
18	AM5KP184	SCREW 8-32 X 3/8 PHIL PAN SST	4	EA
19	AMS1P056	WASHER #8 LOCK SST	4	EA

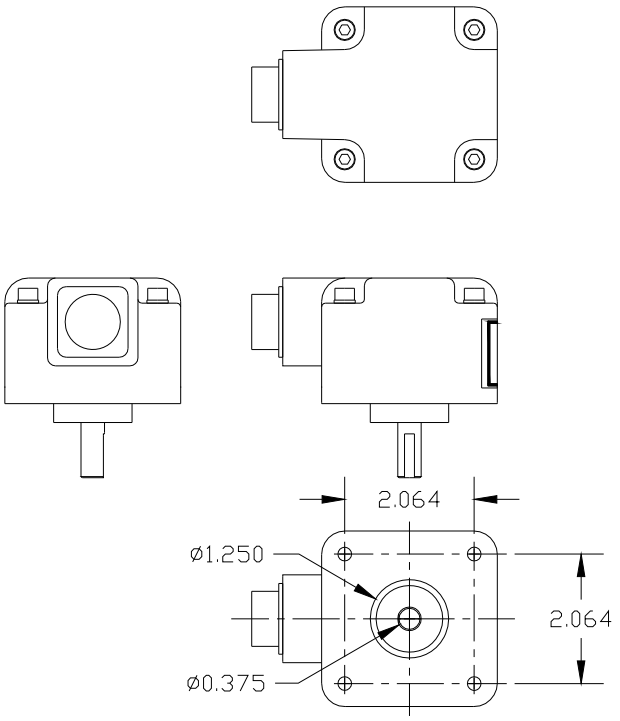


5.5.8 LOAD PIN - DIFFERENTIAL - AMSLA550B



ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AMSLP151	PIN LOAD 30K# 1-1/2OD 2.0mV/V 350 OHM 10VDC EXC HEADER	1	EA
5	AMS8P055	CONN KPT02A16-8P	1	EA
6	AMS8P056	DUST CAP KPT8116C RECEPT	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
9	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	AMS8P034	SCREW 4-40 X 3/8 SOC HD SST	6	EA
13	AM5KM649	LABEL LOAD PIN Ex nA 0-1.5V D	1	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	6	EA
18	AMS1P040	SCREW 6-32 X 3/8 PHIL PAN SST	4	EA
19	C276P046	WASHER #6 LOCK SS	4	EA

5.6.1 ENCODER - HI RESOLUTION - AM5KA068B



P/N	DESCRIPTION	QTY	UNIT
AM5KP161	ENCODER H25D-SS-1200-ABC-4469 EEx nA	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-18DA	2	EA

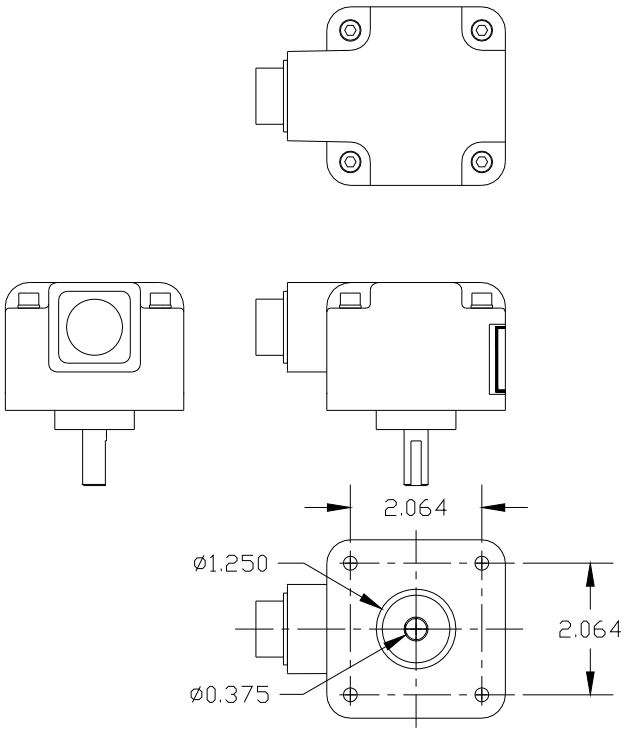
Specifications

1200 Pulses per revolution
+5 to +15 vdc power
Differential Quadrature output (A – A not, B – B not)

Pin Out

E - A
C - A
G - B
D - B
A - +5 to +15 vdc
B - Gnd
F - Case

5.6.2 ENCODER - HI RESOLUTION - AM5KA070B



P/N	DESCRIPTION	QTY	UNIT
AM5KP163	ENCODER H25D-SS-1200-ABC-4469 EEx nA	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-18DA	2	EA

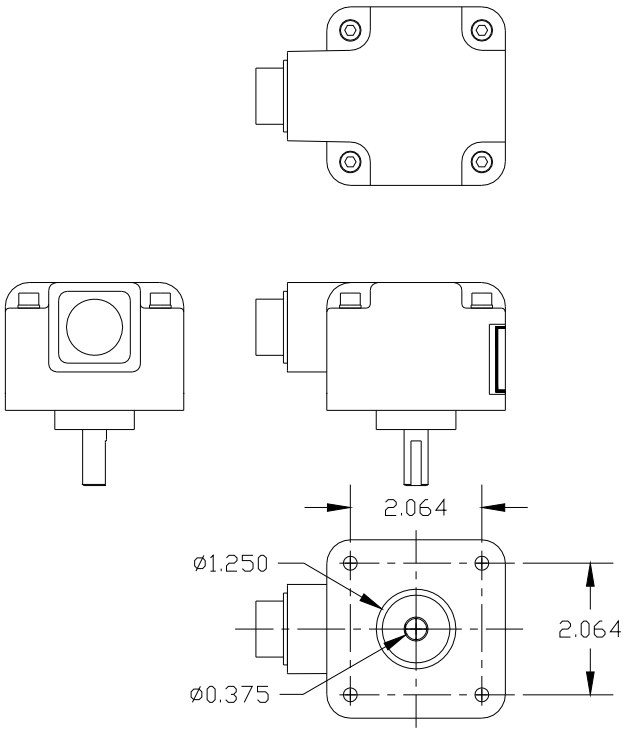
Specifications

1200 Pulses per revolution
+5 to +15 vdc power
Differential Quadrature output (A – A not, B – B not)

Pin Out

A - A
C - A
B - B
E - B
D - +5 to +15 vdc
F - Gnd
G - Case

5.6.3 ENCODER - HI RESOLUTION - AM5KA074B



P/N	DESCRIPTION	QTY	UNIT
AMSLP061	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-18DA	2	EA

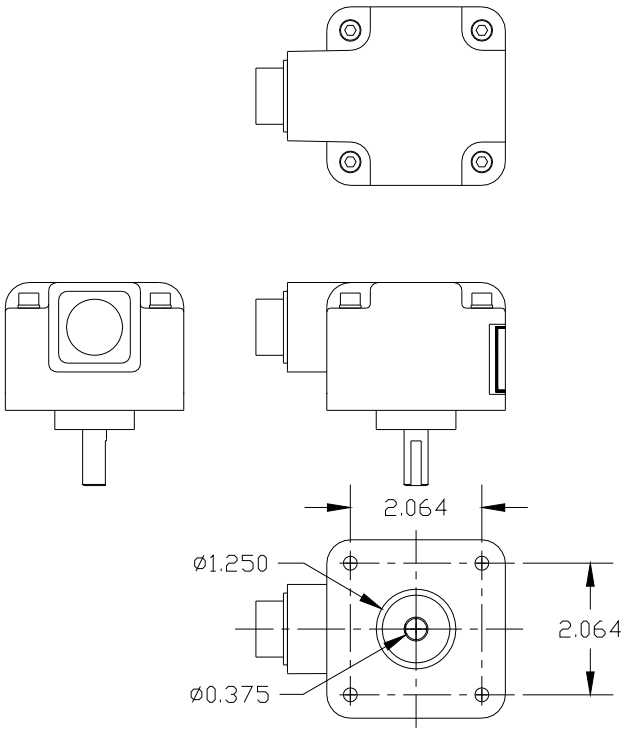
Specifications

1200 Pulses per revolution
+5 to +15 vdc power
Differential Quadrature output (A – A not, B – B not)

Pin Out

A - A
H - A
B - B
I - B
D - +5 to +15 vdc
F - Gnd
G - Case

5.6.4 ENCODER - HI RESOLUTION - AM5KA079B



P/N	DESCRIPTION	QTY	UNIT
AM5KP188	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-18DA	2	EA

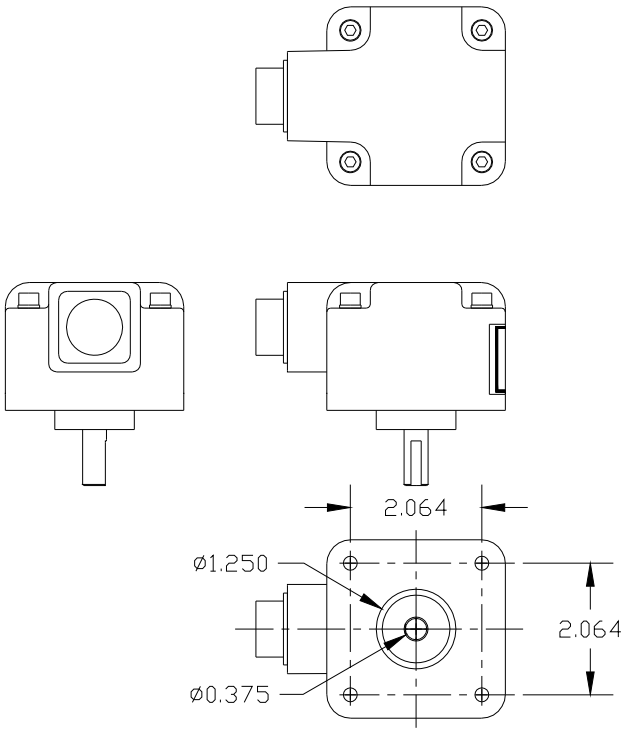
Specifications

1200 Pulses per revolution
+5 to +15 vdc power
Differential Quadrature output (A – A not, B – B not)

Pin Out

E - A
C - A
G - B
D - B
A - +5 to +15 vdc
B - Gnd
F - Case

5.6.5 ENCODER - HI RESOLUTION - AM5KA080B



P/N	DESCRIPTION	QTY	UNIT
AM5KP192	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-18DA	2	EA

Specifications

1200 Pulses per revolution
+5 to +15 vdc power
Differential Quadrature output (A – A not, B – B not)

Pin Out

A - A
C - A
B - B
E - B
D - +5 to +15 vdc
F - Gnd
G - Case

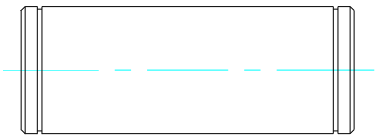
5.7 OPTIONAL ACCESSORIES

5.7.1 LOAD PIN - REPLACEMENT PIN - AMSLM113

In the event the load pin needs to be removed for calibration or repair, a pin can be inserted in its place to support the tension wheel.

At this time a hydraulic load cell can be used to provide tension. The depth portion of the measuring head will still function properly and accurately.

A 1” diameter shoulder bolt can be used as a substitute. The bolt needs to have at least a 2-1/2” shoulder. It should be of at least grade 8 to support the potential load.



LOAD PIN

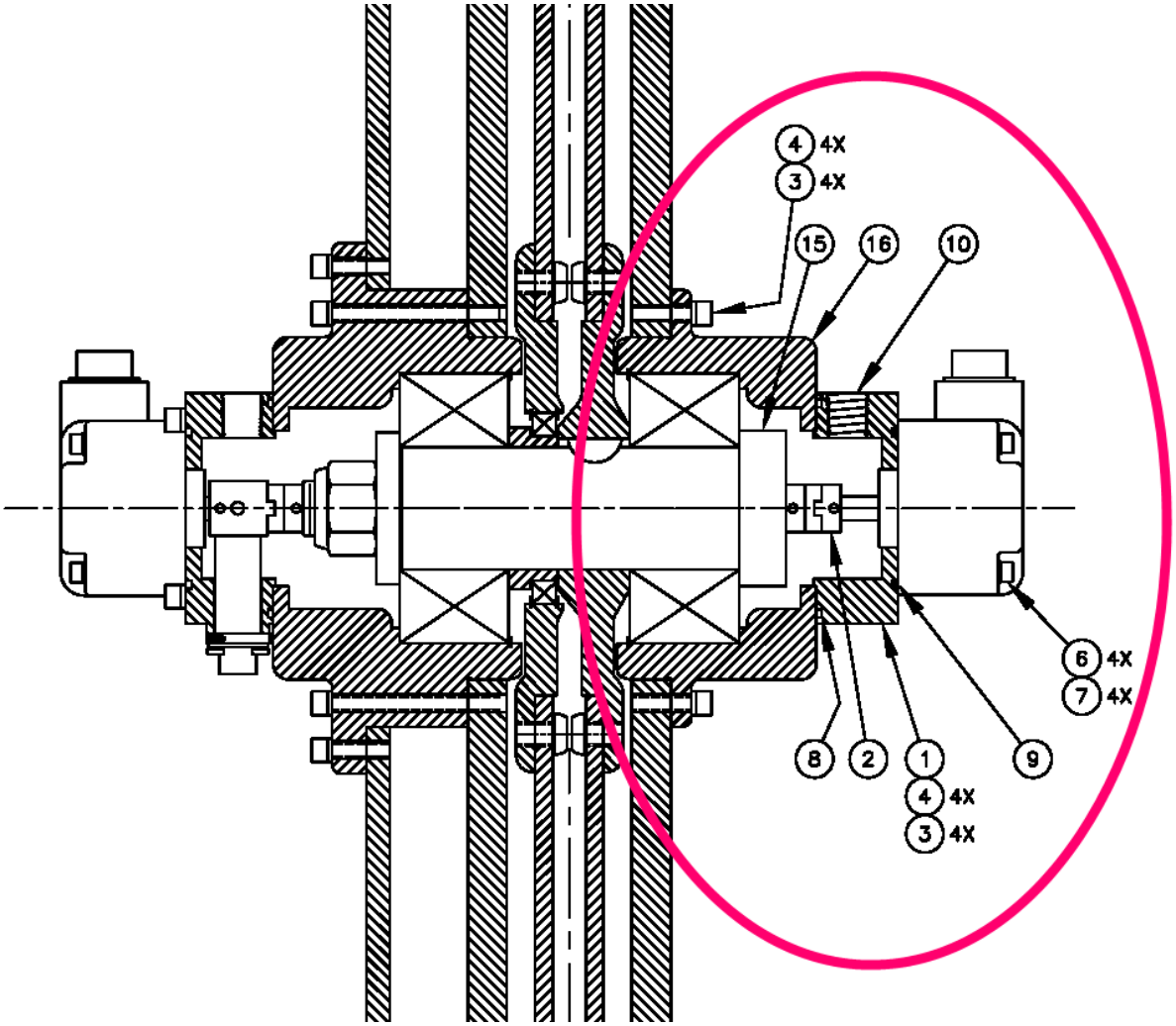
5.7.2 DRIP LINE OILER - FSU1A013

This oiler features a Lexan reservoir with self closing filler cap. The flow is regulated by adjusting the valve at the base of the reservoir. A mount is provided on the measuring head. A copper tube channels the fluid to the wireline where it first enters the measuring head.

P/N	DESCRIPTION	QTY	UM
FSU1P051	RESERVOIR DROP FEED 1/2 NPT	1	EA
AMSLM005	MOUNT LINE OILER DRIP TANK	1	EA
FSU1P050	ADPTR 1/4COMP X 1/2MPT 90 BRS	1	EA
FSU1P011	COPPER TBG 1/4 OD	2	FT

5.7.3 DUAL ENCODERS - AMSLA574A KIT

The 2nd encoder option is available on the Thresher measuring head.



5.7.3 DUAL ENCODERS - AMSLA574A KIT continued

Spare parts list for Dual Encoder

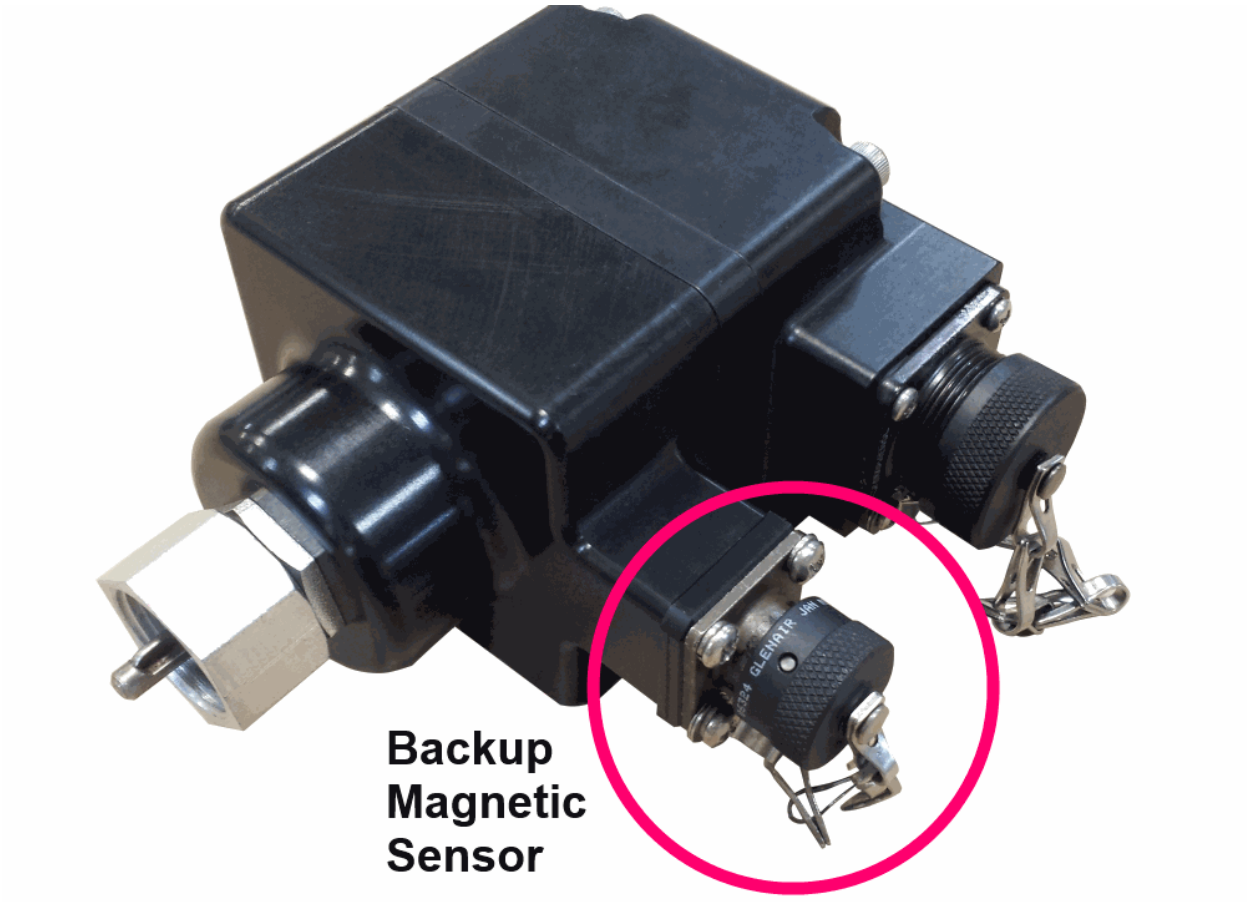
LINE	P/N	DESCRIPTION	QTY	REF
	AMSLA574	PARENT - KIT 2ND ENCDR MOUNT ORCA		
1	AM5KM057	ADAPTER ENCODER H37C/H25D	0	Ref
2	AM5KM073	COUPLING MOD ENCDR 0.250/0.375	0	Ref
3	C276P031	SCREW 1/4-20 X 1-1/4 SOC HD SS ENCODER MOUNT	4	ENCODER MOUNT
4	AM5KP144	WASHER 1/4 LOCK SS HIGH COLLAR 0.363 OD X .093 THK	4	Nor
5	AMS1P052	SCREW 10-24 X 5/8 SOC HD SST ENCODER	4	ENCODER
6	AMS1P053	SCREW 10-24 X 2 SHCS SST HD ENCODER HSG	4	HD ENCODER HSG
7	C276P035	WASHER #10 LOCK SS ENCODER	4	ENCODER
8	AMS1P014	O-RING 2-152 BUNA N ENC ADPTR 3-1/4 X 3-7/16 X 3/32	1	Nor
9	AM5KP071	O-RING 2-141 BUNA N H25 ENCDR 2 5/16 x 2 1/2 x 3/32	1	Nor
10	AMS1P072	PLUG 3/8 NPT SS	1	Nor
15	AMSLM575	SHAFT MEAS WHL 50MM ENCDR/RT ANGLE DR 5/16 ORCA	-1	Nor
15	AMSLM573	SHAFT MEAS WHL 50MM ENCDR X2 5/16 ORCA	1	Nor
16	AMSLM592	ADAPTER COUNTER HD RT ANGL DRV 5/16 ORCA 2 WHL COUNTER	-1	Nor
16	AMSLM574	ADAPTER MEAS WHL SHAFT 50MM OPEN SIDE 2ND ENCDR ORCA	1	Nor

5.7.4 ADD-ON ENCODER ASSEMBLY OPTICAL DRIVE - AMSLA192

This adapter provides a means to connect a second encoder to the speedometer drive.

5.7.5 ADD-ON ENCODER ASSEMBLY WITH BACKUP – AMSLA093

This adapter is also available with a magnetic pickup sensor to drive a backup depth panel.



6.0 SCHEMATICS & WIRELISTS

6.1 SCHEMATICS

Schematic drawings for load pins and encoders are not provided.
They contain either proprietary information and/or are purchased from 3rd party suppliers.

Additionally, load pins and encoders are not field reparable.

6.2 WIRELISTS

Wirelists do not pertain to this type of equipment.

7.0 CABLE DRAWINGS

NOTE - All Cable Drawings are included in the respective panel manuals.